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THE CHANGING CONSUMER BEHAVIOR BETWEEN REAL LIFE AND DIGITAL WORLD

Editorial of the International Journal of Economic Behavior, Vol. 14

As technology continues to permeate our daily lives, consumer behavior has shifted notably between the physical and digital realms. The convergence of these domains, largely due to the rise of social media, e-commerce, and virtual reality, has transformed how individuals make purchasing decisions, interact with brands, and communicate socially.

Consumer behavior has long been influenced by evolving social and economic factors. With digitalization, the line between real-world interactions and digital experiences has blurred, impacting consumers' perceptions and their engagement with products and services. Recent studies (Keikhosrokiani, 2022); Rangaswamy *et al*., 2022) have outlined the fundamental shifts in consumer behavior due to digital integration. These shifts have altered traditional shopping patterns and redefined the social interactions surrounding consumption.

The Virtualization of Consumer Behavior. Digital identity has been was identified as a significant driver of consumer behavior (Wittich *et al*., 2024). Individuals increasingly cultivate their online personas, which often differ from their real-world identities. As digital identities gain importance, consumers make purchases that align with their desired virtual image. This shift underscores the role of social media platforms as central hubs for consumer engagement, where individuals project idealized versions of themselves (Hadi *et al.,* 2024).

The convenience offered by digital shopping channels has been a major catalyst in the shift toward online purchasing. The Covid-19 pandemic has accelerated the adoption of e-commerce, and this trend has become more permanent, as consumers now value the seamlessness of digital transactions, further encouraged by innovations like one-click purchasing and subscription models. Such digital-native conveniences have raised consumer expectations for real-life shopping experiences, driving the need for retailers to blend online and offline channels (Fortuna et al., 2021).

Virtual and augmented reality technologies have introduced a new dimension to consumer experiences, allowing individuals to interact with products digitally before purchasing them. Celestin *et al.,* (2024) emphasize that VR/AR technologies enable immersive experiences, which can enhance brand loyalty and product satisfaction by providing a "try-before-you-buy" experience. This phenomenon not only influences consumer choices but also expands the potential for personalization, as companies tailor virtual experiences to align with consumer preferences.

Social and Economic Implications. While digital platforms facilitate consumer engagement and brand interaction, they also create challenges related to digital disconnection and authenticity. Prolonged digital engagement can lead to reduced social interaction in real life. Additionally, consumers face the paradox of presenting an idealized self-image while grappling with real-world insecurities. The emphasis on "likability" and social validation online influences consumer choices, particularly in fashion and lifestyle products, often promoting aspirational rather than practical consumption.

By an economic point of view, with the rise of digital assets, such as NFTs (Non-Fungible Tokens) and digital collectibles, consumers now spend significant amounts on virtual goods (Tan, 2024), This economic shift has encouraged brands to diversify into digital offerings, creating new revenue streams and stimulating innovation in marketing strategies. However, the long-term sustainability of these virtual assets remains uncertain, also considering their environmental impact and the digital rights issues.

Social media platforms are critical in shaping consumer behavior, with influencers playing a central role in guiding purchasing decisions. Consumers are increasingly influenced by the recommendations of online personalities, as they view influencers as more trustworthy than traditional advertisements. This shift towards influencer-based marketing has altered advertising landscapes and given rise to micro-influencers, who target niche markets and foster deeper engagement. Companies must navigate this new terrain carefully, as reliance on influencers can lead to ethical concerns, particularly around transparency and authenticity (Steils *et al*., 2022).

Adapting to Hybrid Consumption: The Future of Consumer Behavior. As digital and real-world consumer experiences become increasingly intertwined, businesses must adapt to a hybrid model of consumption that combines digital innovation with tangible experiences. The consumer demand for seamless transitions between digital and physical experiences is growing, whether in the form of personalized online recommendations that lead to in-store purchases or digital platforms that facilitate real-world gatherings. This hybrid approach is essential for brands aiming to sustain consumer interest and build loyalty in an evolving marketplace.

Moreover, advancements in artificial intelligence and machine learning are expected to further refine consumer targeting, offering hyper-personalized experiences across platforms. By embracing these changes, businesses can stay competitive while addressing the unique demands of the modern consumer, who seeks convenience, personalization, and authenticity in both virtual and physical environments.

In conclusion, it is possible to state that the shifting consumer behavior between the real and digital worlds reflects broader social and economic changes, driven by digitalization and the virtualization of lifestyle. Consumers increasingly prioritize online identities, convenience, and virtual assets, transforming traditional consumption patterns and redefining brand interactions. As we move towards a more interconnected marketplace, companies must adopt hybrid strategies that cater to consumers' needs across both domains. Future research should focus on the ethical implications of digital influence and explore sustainable models for virtual economies. Ultimately, understanding these shifts is essential for brands and policymakers aiming to navigate the complexities of modern consumer behavior.

Fabio Musso

Editor-in-Chief

References

Hadi, R., Melumad, S., & Park, E. S. (2024). The Metaverse: A new digital frontier for consumer behavior. *Journal of Consumer Psychology*, *34*(1), 142-166.

1. Wittich, J. S., Salge, T. O., & Wentzel, D. (2024). *Consumer behavior in the digital era: exploring identity dynamics in service innovations* (Doctoral dissertation, Universitätsbibliothek der RWTH Aachen).

2. Rangaswamy, E., Nawaz, N., & Changzhuang, Z. (2022). The impact of digital technology on changing consumer behaviours with special reference to the home furnishing sector in Singapore. *Humanities and Social Sciences Communications*, *9*(1), 1-10.

3. Keikhosrokiani, P. (Ed.). (2022). *Handbook of research on consumer behavior change and data analytics in the socio-digital era*. IGI Global.

4. Fortuna F., Risso M., Musso F. (2021), "Omnichannelling and the Predominance of Big Retailers in the Post-Covid Era", *Symphonya Emerging Issues in Management*, n. 2, pp. 142-157. https://dx.doi.org/10.4468/2021.2.11fortuna.risso.musso.

5. Celestin, M., Sujatha, S., Kumar, A. D., & Vasuki, M. (2024). Exploring the Impact of AR and VR on Enhancing Customer Experiences and Driving Sales in Retail. *International Journal of Interdisciplinary Research in Arts and Humanities*, *9*(2), 87-94.

6. Tan, Y. (2024). Implications of blockchain-powered marketplace of preowned virtual goods. *Production and Operations Management*, *33*(6), 1393-1409.

7. Steils, N., Martin, A., & Toti, J. F. (2022). Managing the transparency paradox of social-media influencer disclosures: How to improve authenticity and engagement when disclosing influencer–sponsor relationships. *Journal of Advertising Research*, *62*(2), 148-166.

THE CHARACTERISTICS AND ATTITUDES OF PASSENGERS TOWARDS THE QUALITY OF SERVICES PROVIDED ON THE COASTAL ROUTES OF SOUTHWEST CRETE

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Abstract

The ports of southwest Crete mainly concern those of Gavdos, Agia Roumeli, Loutro, Palaiochora, Sougia and Chora Sfakion. The main objective of this article is to analyze passengers' characteristics, market conditions, and attitudes of Cretan residents towards the quality of services provided on the coastal routes of this specific region. The research is unique and can be extended to high demand coastal lines worldwide. We focused mainly on the "Sfakia-Agia Roumeli" coastal line, which consistently gathers the highest passenger traffic, and on the coastal company which holds an almost monopoly position in the market. In this context, primary research through structured questionnaires took place. The results showed that the participants are not completely satisfied with the company and its services, consider safety on-board as the most important quality factor, are concerned by the age of the ships and are willing to pay more for any quality improvements. Also, non-parametric inferential tests revealed that passengers who travel with their vehicle are more satisfied than those who travel without it, while their degree of satisfaction is stronger the more times they have traveled on these lines and if they travel for business reasons.

1. Introduction

Gavdos, Agia Roumeli, Loutro, Palaiochora, Sougia, and Chora Sfakion are the main ports in Southwest Crete (figure 1). There is a great amount of passengers transferred between these locations concerned 15.24% of the total passenger traffic of Crete and 0.97% of the total passenger traffic of Greece (table 1). Coastal lines in this area are primarily served by one shipping company (CC), although there are several smaller competitors. The weight of scientific research on Crete's coastal shipping has focused mainly on the high-traffic ports

of Heraklion and Souda (Boile, Theofanis, Perra, & Kitsios, 2023). There has been no research into the perceptions of coastal service users in southwest Crete.

Figure 1 – Map of Crete and its ports.

Source: Inspired by d-maps.com

The main objective of this article was to fill this gap and analyze the passengers' characteristics, market conditions, and attitudes of Cretan residents towards the quality of services provided on the coastal routes of southwest Crete (figure 1). The proposed research is both original and unique. As we mentioned, there are significant gaps in the literature about the characteristics and assessment of passengers' attitudes towards the coastal shipping lines of southwest Crete and the companies operating in them. In particular, the passengers' perception of the quality of coastal services provided on these lines, the analysis of the specific market, the effect of passengers' socio-economic characteristics on their satisfaction with the trip and the approximation of the price elasticity of demand have not been ever happen.

The main research questions we attempted to answer were many, but it was deemed necessary because the analysis is exploratory and nothing scientifically similar has been carried out in the past. Therefore, the above eight (8) questions were raised for examination:

RQ1. *What are the attitudes of Cretan residents towards CC based on: a) the reliability of its routes, b) the ships' comfort and the safety provided to passengers, c) its land and on-board services, d) its pricing policy and e) its potential competitors?*

RQ2. *What is the ranking of the importance of the coastal service quality factors for the passengers of this line (S-A)?*

RQ3. *To what extent are passengers willing to pay an additional fare, if a modern ship enters the market, with improved services provided and possibly halving the journey time?*

RQ4. *How do passengers rank the rest of CC's lines of activity in relation to their quality characteristics?*

RQ5. *How satisfied are passengers, on a more general level, with CC?*

RQ6. *Does "gender", "traveling with family" and "traveling with the vehicle" affect respondents' overall satisfaction with CC?*

RQ7. *Is there a difference between respondents of different "age", "educational level", "profession", "work area", "marital status", and "number of children", in terms of their overall satisfaction with CC?*

RQ8. *Is there a difference between respondents of "different number of trips" and "different reasons for traveling" on this line, in terms of their overall satisfaction with CC?*

At a structural level, after analyzing the ports and the coastal lines of southwest Crete, we described the quality factors of coastal transportation in GCS, as they emerge from the literature. We focused mainly on the "Sfakia-Agia Roumeli" (S-A) coastal line, which consistently gathers the highest passenger traffic, and on the coastal company (CC) which holds an almost monopoly position in the market. In this context we attempted to evaluate the demographic characteristics of passengers, the main reason for their trip, the times they have traveled on this line and the choice to take their vehicle with them. We also investigated the route reliability, the company's pricing policy, the ship's amenities (comfort), the security provided and the land and on-board services. In this context, primary research through structured questionnaires took place and descriptive statistics and non-parametric inferential tests were applied.

Additionally, there is much room for further in-depth research in the future. We hope that our results will add to the existing knowledge and extend the analysis to similar travel destinations worldwide. The following analysis can be used by shipowners as it has managerial implications. For instance, on highly seasonal coastal lines it may determine passengers' perceptions of the quality of service provided. This can help coasters on the one hand to faciliate their business strategy and on the other to implement appropriate marketing policies to attract passengers. Furthermore, it may have theoritical implications. On the one hand it can lead to confirmatory factor analysis to find the appropriate continuous variables for further inferential tests. On the other hand, the same methodology may be applied to other modes of transportation, such as airplanes, trains, and, of course, cruises.

2. Literature review

2.1 The ports and the coastal lines of southwest Crete

The ports of Crete mainly concern those of Chora Sfakion (Sfakia), Souda, Sougia, Sitia, Rethymno, Palaiochora, Loutro, Kasteli Kissamos, Agios Nikolaos, Agia Roumeli, Heraklion and Gavdos (figure 1). Based on data provided by the Hellenic Statistical Authority (HSA), between 2000-2021 the passenger traffic in all Cretan ports was 31,258,707 passengers and represented 6.38% of the Greek region's passenger traffic (489,741,110 passengers) (table 1) (HSA, 2000-2022). The ports with the largest passenger traffic were Heraklion (50.69%), Souda (27.14%) and Agia Roumeli (8.97%) (table 1). The

main reason is that the first two connect Crete with the largest port of Greece (Piraeus) and the third welcomes tourists who cross the most famous gorge of Crete (Samaria Gorge). Then these passengers are transferred inland by coastal ships (Chora Sfakion) (figure 1).

Southwest Crete's ports are primarily located in Gavdos, Agia Roumeli, Loutro, Palaiochora, Sougia and Chora Sfakion (figure 1). Plakias and Agia Galini are two smaller ports, but they show little passenger traffic, and we will not take them into account. Between 2000 and 2021, Agia Roumeli had the biggest market share among southwest Crete ports (58.88%), followed by the port of Chora Sfakion (22.04%), the port of Loutro (11.27%), the port of Palaiochora (3.21%), the port of Sougia (2.69%) and finally that of Gavdos (1.91%) (HSA, 2000-2022) (table 1).

Table 1 – Passenger traffic statistics in Cretan ports from 2000 to 2021

Passenger traffic in all the ports of Crete	% of passenger traffic in Cretan ports, compared to the rest of Greek ports	N. of boarded passengers at Cretan ports of southwest Crete	% of passenger traffic in the southwest Cretan ports, compared to the rest of Crete ports	% of passenger traffic in the southwest Cretan ports, compared to the rest of Greek ports
1,258,707	6.38%	4,763,575	15.24%	0.97%
Cretan Ports	Passenger traffic per port of Crete	% distribution of passenger traffic per port of Crete	N. of passengers served per port of southwest Crete	% distribution of passenger traffic per port of southwest Crete
Gavdos	91,021	0.29%	91,021	1.91%
Heraklion	15,846,416	50.69%	0,00	0.00%
Agia Roumeli	2,804,668	8.97%	2,804,668	58.88%
Agios Nikolaos	184,832	0.59%	0,00	0.00%
Kasteli Kissamos	193,201	0.62%	0,00	0.00%
Loutro	536,991	1.72%	536,991	11.27%
Palaiochora	152,990	0.49%	152,990	3.21%
Rethimno	1,531,081	4.90%	0,00	0.00%
Siteia	255,403	0.82%	0,00	0.00%
Sougia	127,986	0.41%	127,986	2.69%
Souda	8,484,200	27.14%	0,00	0.00%
Sfakia	1,049,919	3.36%	1,049,919	22.04%
Passenger traffic in all the ports of Greece	*489,741,110*			

Source: Processing HSA data (2000-2021)

The rule of seasonality is evident in all Greek coastal shipping (GCS) (Goulielmos & Sitzimis, 2014; Sitzimis, 2021a; Sitzimis, 2021b; Sitzimis, 2022; Sitzimis, 2021c). Strong seasonality occurs in Crete during the summer (third quarter of the year), with percentages in many cases being above 50% (HSA, 2000-2022). It is worth mentioning that in the 3rd quarter (2000-2021 average), approximately 50% of Heraklion's passenger traffic boarded in Souda and approximately 50% of Souda's passenger traffic in Agia Roumeli (HSA, 2000-2022). A small port, due to the high tourist demand, is competitive with two of the largest ports in Greece.

In absolute terms, the coastal lines of southwest Crete with the highest passenger traffic (for the years 2019-2022) are the following seven (7): "Agia Roumeli-Sfakia", "Agia Roumeli-Sougia", "Loutro-Sfakia", "Sfakia-Loutro", "Gavdos-Sfakia", "Agia Roumeli-Palaiochora" and "Sfakia-Agia Roumeli" (HSA, 2000-2022). In particular, 617,568 passengers were transferred in the first four (4), with an average of more than 25,000 passengers. The line "Agia Roumeli-Sfakia" had an average of 57,929 passengers, followed by "Agia Roumeli-Sougia" with 43,409 passengers, "Loutro-Sfakia" with an average of 25,103 passengers, "Sfakia-Loutro" with 27,951 passengers, and "Sfakia-Agia Roumeli" with 9,051 passengers (table 2).

In summary, 696,355 people were transferred on all seven (7) lines, with an average of 24,870 passengers per year and per line (table 2). (HSA, 2000-2022). There is an obvious decrease for the years 2020 and 2021 when there were state restrictions on passenger movements due to the Covid-19 pandemic (Boile, Theofanis, Perra, & Kitsios, 2023; Kouhihabibi, 2021). For the year 2022, the "Agia Roumeli-Sfakia" coastal line gathered 33.87% of the total passenger traffic, the "Agia Roumeli-Sougia" line 29.90%, the "Sfakia-Loutro" line 14,49%, the "Loutro-Sfakia" line 10.33%, the "Sfakia-Agia Roumeli" line 5.03%, the "Agia Roumeli-Palaiochora" line 4.24% and the "Gavdos-Sfakia" line 2.14% (table 2).

Table 2 – Passenger traffic on the seven (7) main coastal lines of southwest Crete (years 2019-2022)

	Number of passengers						
Coastal Lines	2019	2020	2021	2022	Total	*Mean*	2022 (%)
Agia Roumeli-Sfakia	82,039	29,542	48,068	72,065	231,714	*57,929*	33.87%
Agia Roumeli-Sougia	49,341	22,650	38,035	63,611	173,637	*43,409*	29.90%
Agia Roumeli-Palaiochora	7,156	3,156	6,027	9,030	25,369	*6,342*	4.24%
Loutro-Sfakia	28,402	23,787	26,253	21,970	100,411	*25,103*	10.33%
Sfakia-Agia Roumeli	10,006	6,903	8,601	10,692	36,203	*9,051*	5.03%
Sfakia-Loutro	30,572	21,057	29,360	30,816	111,805	*27,951*	14.49%
Gavdos-Sfakia	3,865	4,835	3,956	4,559	17,216	*4,304*	2.14%
Total	211,382	111,930	160,300	212,744	696,355	*24,870*	100.00%

Source: Processing HSA data (2019-2022)

2.2 Quality factors of coastal transportation services in GCS

According to Cole (2005) the quality of transport service depends mainly on the departure or arrival times (frequency), standard of service, comfort, reliability, and safety. Sambrakos broadly endorses this view (2018). Other authors focus on, among other things, travel time and fare level (Grigoroudis & Siskos, 2004; Hensher, Stopper, & Bullock, 2003; Tyrinopoulos & Aifadopoulou, 2008). Yuen and Thai (2015) argue that quality is one of the pillars of user satisfaction of a service. Although the variables "quality" and "user satisfaction" are related to each other, they are not completely identical (Pantouvakis, 2010). The main difference is that user satisfaction reflects their experience of using the service, while quality improvements, which are not based on user needs, do not necessarily

lead to their satisfaction (Lacobucci, Ostrom, & Grayson, 1995). However, this correlation is basically positive (Qin & Prybutok, 2009; Senic & Marinkovic, 2014).

Liner and passenger (coastal) shipping show many similarities to each other (Dimitriadis, 2016; Drozhzhyn, Koskina, & Tykhonina, 2021). The market conditions of carriers operating passenger routes are similar to carriers operating general cargo routes. Yuen and Thai (2015) concluded that the descending order of the effect of quality factors on liner shipping user satisfaction is: reliability, speed, responsiveness (shippers' satisfaction) and freight charged.

In GCS, according to Goulielmos and Sitzimis (2014) quality of service depends on crossing hours, speed, age, and comfort. As they note, in relation to the liberalization of GCS (2006), the quality of service was never regulated and thus was never deregulated. Lekakou et al. (2011) examining the coastal routes on the island of Chios, they concluded that for conventional ships the most important quality factors are reliability, comfort, frequency of routes and crew attitude. The least important is recorded by the duration of the trip. On high-speed vessels, reliability, comfort, and crew attitude come first, while vehicle fare comes last. Extending the analysis to a "barren" (subsidized) line in northern Greece, they found the special role of route reliability, ticket price and crew attitude and not so much other factors such as the duration of the trip and the frequency of the route. Khan et al. (2018) used structural equation modeling to investigate the association between the passenger ferry's overall perceived quality of service and service variables. It can be shown that, out of the three endogenous variables, the ferry's fitness has the biggest impact on the degree of service provided by the passenger ferry, followed by riding safety and comfort level.

According to Profillidis (2016) the quality of transport service is the most critical parameter in determining the demand of a transport service, after the price. In fact, quality of service plays an important role in pricing. For instance, newer and faster coastal ships charge higher fares than conventional ships (Goulielmos & Sitzimis, 2014). Profillidis (2016) considers that in passenger transport quality depends on: a) transport conditions (comfort and service on-board), b) travel time (speed), c) reliability of the means of transport (departure-arrival time), d) transport safety (risk of accident), e) the frequency and flexibility in choosing the departure-arrival time. This article is largely based on this research perspective. We consider that the categorization listed by the author clearly and concisely describes the general research results around the issue and fully covers our objective. In fact, he also sets weighting factors for these quality factors. Safety scores 30%, journey time 24%, route reliability 21%, comfort 18% and flexibility in departure-arrival time selection 7%. What remains is to confirm the correctness of what he said.

3. Research methodology

As is well known, the population in a survey or statistical population is the set of examined individuals-elements that can be included in the survey (Babbie, 2018; Zafeiropoulos, 2015). In our case, we focused on Cretan residents and mainly on the residents of the prefecture of Chania, as they are CC's dominant customer base (mainly in the non-summer months). Our selection did not include domestic and foreign tourism, due to the time constraints of the survey. The research was carried out in the period between January (12/1) and April (13/4) 2023. Certainly, in the future the same analysis could and should be extended to them as well (i.e. to take place also in the May-November period). This does

not of course mean a qualitative lag in the conclusions as the residents are the ones who have traveled the most times with the company's ships and have a more crystallized view of the quality of services provided.

Structured questionnaires were distributed online (google forms) to measure the conceptual framework variables and the correlations between them (Saunders, Lewis, & Thornhill, 2019; Schindler, 2019; Zafeiropoulos, 2015). Essentially, in this research we included in the analysis a single coastal line of southwest Crete (S-A). This focus allowed us to make detailed observations, something that cannot be done with large samples (e.g. in all other lines), without high costs (Saunders, Lewis, & Thornhill, 2019). Also, the method is useful, because being the research at a primary level, it can direct future study to other routes.

With the structured questionnaire we managed to collect useful data and information in a very short time. Compared to other research tools, it is minimally expensive (time, money, and effort), while the researcher, without interfering, often gets honest answers to delicate questions (Schindler, 2019). In our study, online questionnaires were administered as the majority of the target population was computer literate, there was certainty that the right person was answering, there was little chance of respondent bias, the questionnaire was easily readable, and automatic data entry occurred (Zafeiropoulos, 2015). The Statistical Package for the Social Sciences (SPSS 22) was used to analyze the structured questionnaire (Gnardellis C. , 2019; Gnardellis C. , 2013; Roussos & Tsaousis, 2020).

In relation to sample selection, we observed an equal percentage ratio in gender. In other words, we followed the quota sampling method. Our Sampling units were selected based on predetermined characteristics. The aim was for the sample to have the same distribution of characteristics as the general population. In other words, the sample can be considered representative (Dimitriadis, 2016). We know that the ratio of men to women in the Greek population is about 50:50. According to the most recent figures of HSA (population census 2021), in all the Municipalities of the prefecture of Chania, on average 51.5% were men and 48.5% were women (www.statistics.gr). The sample was therefore selected approximately based on this ratio, i.e. 134 men and 126 women, in a total of 260 questionnaires. The confidence level was set at 95%, the level of statistical significance at 5%, while the standard error ranged at 6% (Dancey & Reidy, 2020). Generally, the minimum acceptable error of estimation in these customer satisfaction surveys is 5% (Bartlett, Kotrlik, & Higgins, 2001; Hejazi & Fawzy, 2021), but as the sample is representative (only people who had traveled on the S-A line were selected), the small deviation is not expected to affect the validity of the research.

The design of the questions included:
- 31 closed-type questions (Likert scale of the form "1: not at all, 2: slightly, 3: moderately, 4: very, 5: extremely") and 4 similar questions of the form "1: worse, 2: relatively worse, 3: the same, 4: relatively better, 5: better', in order to measure the variables of our conceptual framework (quality of coastal services provided and passenger satisfaction with CC) and the correlations between them.
- 8 closed-type questions (multiple choice) on respondents' demographic and socio-economic data.
- 6 closed-type questions (multiple choice) regarding the respondents' general perceptions of the S-A line and a corresponding one (1) for the rest of the coastal lines operated by CC.

- 3 closed-type questions (multiple choice) and one (1) open-ended question for the S-A line passengers' more crucial factors for a high-quality coastal service.
- 2 closed-ended questions (multiple-choice) to assess qualitatively the price elasticity of demand on the 'S-A' line.

4. Descriptive statistical analysis of data and results

4.1 The demographic and socio-economic characteristics of respondents on the S-A line

The sample of research participants consists of 134 men (51.5%) and 126 women (48.5%), predominantly aged 25-54 years (64.6%), the majority of whom reside in urban areas (59.6%) in the city of Chania (88.8%). Basically, they are high school graduates (36.2%) and higher education graduates (65.4%). Most of them work as employees in the private sector (35.0%), are married (46.5%) and have no children (51.5%).

In relation to the respondents' general perceptions of the S-A line, 49.2% have traveled on this line 1-3 times in their life and 46.5% never, in the last two years (2021-2022). The most important reason for these trips was leisure (65.0%). Most passengers take this route together with their family (67.7%), without being accompanied by a vehicle (74.6%). This is mainly explained by the lack of need for a vehicle in Agia Roumeli (35.0%) and by the presence of regular public transport (e.g. public bus service Chania-Rethimnon S.A.), either in Omalos or in Chora Sfakion (30.8%) (figure 1). It should be noted that Agia Roumeli can be reached either by hiking from Omalos mountain (and crossing the Samaria Gorge), or by coastal ships from Chora Sfakion.

4.2 The attitudes of Cretan residents towards CC and the services provided on the S-A line

Descriptive statistics for the S-A coastal line were divided into five categories and related to thirty (30) questionnaire questions, almost identical to those of Profillidis (2016): a) the "route reliability" category (scheduled departure-arrival time of the company's ship, frequency of the company's sailings, punctuality of the company's sailings (adherence to the sailing schedule and timely notification of any changes), total duration of the trip), b) the "pricing policy" category (passenger fare, vehicle fare, fare offers), c) the "ship comfort and safety" category (the comfort of shared areas on the ship, cleanliness of the ship, feeling of safety on-board), d) the category "land and on-board services" (ship crew (willingness, service on-board), service time at the ticketing agency, passenger boarding/disembarking procedure, vehicle boarding/disembarking procedure), e) the category "preference for CC over potential competition" (passenger knowledge of the other coastal companies operating on the lines of southwest and northwest Crete, qualitative comparison of CC with the other companies on the same or nearby routes). The last category was added, as there is an increased possibility of new competitors' entrance (due to the high passenger traffic of the S-A line).

For each question of each category, the minimum and maximum value of the answer, the mean, the median, the mode, and the standard deviation were recorded (Dimitriadis, 2016; Norris, Qureshi, Howitt, & Cramer, 2017). At the same time, the percentage distribution of the responses, based on the 5-point Likert scale, was used. Finally, the means of measures of central tendency and standard deviation were extracted. The general logic

was that responses with an average mean of 1-2 on the scale expressed dissatisfaction, responses of 4-5 satisfaction, and response 3 neither dissatisfaction nor satisfaction. Sitzimis (2023) successfully developed a similar methodology for the quality evaluation of a high-school textbook of the Greek educational system.

Of course, applying the mean to Likert scales to draw conclusions is not an appropriate methodology (Dancey & Reidy, 2020; Roussos & Tsaousis, 2020). As a measure of central tendency, it is not meaningful in ordinal variables as we can neither average out the 'not at all' and 'extremely' responses, nor can we assume equal emotional distance between the 'very' and 'extremely' responses. Moreover, respondents are often reluctant to take a clear position and give more weight to the neutral answer "moderately". To facilitate our analysis, we ended up using the mean, with the logic that in our research it reaches the same conclusions as the mode and the median. To establish the reliability of the structured questionnaire given to respondents, we used the Alfa (Cronbach's a), Split-Half and Guttman models (Anastasiadou, 2012). The assessment was done separately for each of the five categories of the questionnaire. All three models confirmed the internal consistency of the questions in all scales of the questionnaire (values greater than 85%) (Akinola & Okundalaiye, 2022).

In relation to the 1st research question, by comparing and summarizing the five (5) evaluation categories for the degree of passengers' satisfaction on the S-A line we find that (table 3) based on the answers' average mean, the greater dissatisfaction of the respondents is expressed for "pricing policy" (3.05) and the highest acceptance for "land and on-board services" (3.69). In no category did the result exceed the value of 3.69, i.e. no satisfaction was expressed by the participants. The mean of the variable (response) with the highest frequency (mode) appears in "land and on-board services" (4.00) and the lowest in "preference against potential competition" (2.80).

The average of the standard deviations across all rating categories ranges from 0.946 to 1.128. This shows that many results are within 0.946-1.128 points above or below the respective mean. It is generally estimated that 70% of all results fall within one standard deviation of the mean (Dancey & Reidy, 2020). For example, in "route reliability" the value 1.033 indicates that almost 70% of the participants answered from 2.34 to 4.40. The percentages of "not at all" to "moderately" responses are particularly high for all categories and reach 65.8% for "preference over potential competition" and 65.7% for "pricing policy". Only in the category "land and on-board services" do the answers "very-extremely" predominate (58.4%). The participants' concerns about the quality of CC's coastal services are evident.

In conclusion and based on the percentage (%) of respondents' answers from "not at all" to "moderately", that is, expressing relative dissatisfaction about the quality of the provided coastal services, we could rank the dynamics of their objections in descending order as follows: 1. Preference to CC over potential competition, 2. Pricing policy, 3. Comfort on-board and Safety, 4. Route reliability, 5. Land and on-board services.

Table 3 – The assessment of the five (5) qualitative variables that affect the level of passenger satisfaction by CC on the S-A coastal line

Evaluation criteria	Measures of central tendency and variance				Response rates	
	Mean	Mode	Median	Std. Deviation	Not at all-Moderately	Very-Extremely
Route reliability	3.37	3.43	3.43	1.033	53.30%	46.70%
Pricing policy	3.05	3.00	3.00	1.128	65.70%	34.30%
Comfort on-board and Safety	3.29	3.25	3.25	1.005	57.95%	42.05%
Land and on-board services	3.69	4.00	3.80	0.977	41.60%	58.40%
Preference to CC over potential competition	3.06	2.80	2.80	0.946	65.80%	34.20%

Source: Our elaboration, 2023.

4.3 The perception of the importance and the ranking of quality assessment categories on the S-A line

The elements that most concern the respondents and would possibly choose a competing company instead of CC (2nd research question) are the age of the ships (17.9%), the high prices of passenger tickets (14.1%), the long journey duration (11.9%), the problematic travel frequency (11.5%) and the feeling of insecurity on-board (11.2%). About six (6) to ten (10) respondents believe that the company's three oldest ships should be replaced immediately, which seems to be in line with its overall potential investment policy.

According to passengers, the most important quality factors are safety on-board (35.1%), route frequency (19.6%), departure-arrival time (18.2%), journey time (13.9%) and comfort on-board (13.2%). The proposals they submit for the improvement of the services provided do not differ significantly from the above answers.

4.4 The qualitative approximation of price elasticity of demand on the S-A line

Of great interest are the answers of the respondents regarding their degree of reaction and response to changes in the ticket price (3rd research question). About 87.5% are willing to pay an increase of 0.01-3€, 66.3% an increase of 3.01-6€ and 45.5% an increase of 6.01-9€ for a modern ship, closed-type, with improved services provided and maintaining the same journey duration. These rates increase significantly by adding the assumption of halving the travel time. They become 95.2%, 82.1% and 57.1% respectively. It appears that demand is relatively inelastic to small fare adjustments.

4.5 The perception of the quality of services provided in the rest of the coastal lines of southwest Crete

Some of the passengers of the S-A line had also traveled on other lines of southwest Crete (4th research question). The dominant responses are "Sfakia-Loutro" (46.9%), "Agia Roumeli-Sougia" (7.3%), "Agia Roumeli-Loutro" (6.9%), "Agia Roumeli-Palaiochora" (6.5%), "Palaiochora-Loutro" (6.5%) and "Sfakia-Gavdos" (6.2%). Since this research is focused on the S-A line and "Loutro" is an intermediate stop (so roughly the same market conditions), we have given weight to the remaining four (4) lines. In other words, we ignored the routes "Sfakia-Loutro" and "Agia Roumeli-Loutro" (table 4). There were four

(4) questions per coastal line. The first referred to route reliability, the second to pricing policy, the third to comfort and safety of the ship and the fourth to land and on-board services.

On the "Agia Roumeli-Sougia" line, the average mean of the answers is 3.58 and the median is 4.00, which shows that the respondents are relatively positive about the quality of the provided coastal services. The highest average values concern question 4 (mean=3.74>3), about land and on-board services and question 1 (mean=3.63>3) about the reliability of the route. On the contrary, the least satisfaction stems from the pricing policy (question 2, mean=3.42>3). On the line "Agia Roumeli-Palaiochora", the average mean is 3.68 and the median is 3.75. The highest mean values are related to land and on-board services (question 4, mean=3.88>3) and route reliability (question 1, mean=3.76>3). Less satisfaction is expressed by the respondents for the pricing policy (question 2, mean=3.53>3) and the comfort-safety of the ship (question 3, mean=3.53>3).

On the "Palaiochora-Loutro" line, the evaluation of the quality of the provided coastal services shows an average mean of 3.54 and a median of 3.50, with none of the mean values being below 3. The greatest satisfaction is related to the reliability of the route (question 1, mean=3.82>3) and with the land and on-board services (question 4, mean=3.71>3) while the lowest average value is again related to the company's pricing policy (question 2, mean=3.29>3). In the line "Sfakia-Gavdos" the quality is evaluated by the respondents as above average (average mean=3.52>3 and median 3.75). All answers are relatively positive, with land and on-board services being the strongest of them (question 4, mean=4.00>3). This is followed by route reliability (question 1, mean=3.69>3), while neither dissatisfaction nor satisfaction is expressed about the pricing policy (question 2, mean=3.00).

In table 4, we compare and summarize the respondents' assessment of the quality of services provided on the coastal lines of southwest Crete "Agia Roumeli-Sougia", "Agia Roumeli-Palaiochora", "Palaiochora-Loutro" and "Sfakia-Gavdos". Based on the percentage of respondents' answers from "not at all" to "moderately", that is, expressing relative dissatisfaction with the quality of the provided coastal services, we could rank the dynamics of their objections, by line, in descending order as as follows: 1. Palaiochora-Loutro, 2. Sfakia-Gavdos, 3. Agia Roumeli-Sougia, 4. Agia Roumeli-Paliochora.

4.6 The general level of passenger satisfaction from CC on the S-A coastal line

In relation to the general level of respondents' satisfaction with CC on the S-A coastal line, concerns not dissatisfaction, but only relative satisfaction (5th research question). About 12.3% are dissatisfied (answers "not at all-slightly"), 44.6% neither dissatisfied nor satisfied ("moderately" answer) and 43.1% satisfied ("very-extremely" answers). However, the latter percentage is weighted more towards the answer "very" (31.2%) and less towards the answer "extremely" (11.9%).

5. Inferential statistical analysis of data and results

5.1 The effect of "gender", "travel with family" and "travel with vehicle" on the overall degree of passengers' satisfaction with CC on the S-A coastal line

In order to answer the 6th research question, we used the non-parametric Mann-Whitney test (Chalkos, 2020; Norris, Qureshi, Howitt, & Cramer, 2017). It is indicated in this

analysis because the values of the dependent variable do not follow the normal distribution (according to the results of the K-S test [D(260)=0.25, p<0.001]) (Roussos & Tsaousis, 2020), the independent variables "gender", "travel with family" and "travel by vehicle" are 2-level categorical and the dependent variable "general satisfaction with the company" is continuous (Dimitriadis, 2016; Roussos & Tsaousis, 2020).

Table 4 – Quality assessment for services provided on four (4) coastal lines of southwest Crete

	Agia Roumeli-Sougia	Agia Roumeli-Palaiochora	Palaiochora-Loutro	Chora Sfakion-Gavdos
Mean	3.58	3.68	3.54	3.52
Mode	3.75	4.00	3.25	3.75
Median	4.00	3.75	3.50	3.75
Std. Deviation	1.063	1.201	1.005	1.164
Not at all-Moderately	42.1%	39.7%	48.6%	42.3%
Very-Extremely	57.9%	60.3%	51.4%	57.7%

Source: Our elaboration, 2023.

We initially set as a null hypothesis that the values distributions of the four populations from which the four (4) groups under consideration are derived are the same. As an alternative hypothesis we assumed that the values distributions of the four (4) populations from which the four (4) groups are derived, while identical in all their characteristics, differ in their means (Norris, Qureshi, Howitt, & Cramer, 2017). In other words, our null hypothesis is that the distributions of the degree of satisfaction of men and women, those traveling alone or as a family, and those traveling with or without their own vehicle, from the CC will be exactly the same (in the alternative hypothesis will vary).

It emerged that there is no statistically significant difference in the mean rankings (or medians) of the groups related to the variables "gender" and "traveling alone or with family" (U=8311, p=0.818 and U=7311, p=0.879) (Norris, Qureshi, Howitt, & Cramer, 2017). Only for the variable "travel with or without a vehicle" was the result statistically significant (U=4763, p=0.001) (table 5). The magnitude of the effect of the independent variable on the dependent variable is r=z/square root N, i.e. r=0.2. According to Cohen's classification of effect sizes which is 0.2 (small effect), 0.5 (moderate effect) and 0.8 and above (large effect), this is a small effect (Lakens, 2013). Finally, we found the median separately for passengers who travel with their vehicle versus those who do not. It seems that the former (median=4) are more satisfied with CC than the latter (median=3).

5.2 The effect of "educational level", "age", "work area", "profession", "marital status", "number of children", "number of trips" and "reason for travel" on the overall passenger satisfaction with the CC on the S-A coastal line

In relation to the 7th and 8th research questions, to find out whether the "educational level", "age", "work area", "profession", "marital status", "number of children", "total number of trips on the line", "number of trips on the line in the last two years" and "reason for travel" influence the respondents' overall degree of satisfaction with CC, we applied the non-parametric Kruskall Wallis test (Chalkos, 2020; Norris, Qureshi, Howitt, & Cramer, 2017). The main reasons were that these were categorical variables with more than two levels and

that the basic condition of data normality was not ensured (Dimitriadis, 2016; Roussos & Tsaousis, 2020).

Based on the data analysis, it was found that only the "total number of trips on the S-A line" [H(3)=14.719, P=0.002)], the "number of trips on the S-A line, in the last two years" and the "reason for traveling on the S-A line" affect the general degree of passenger satisfaction. [H(3)=27.053, P=0.000)], [H(3)=10.658, P=0.014)] (table 5) (Norris, Qureshi, Howitt, & Cramer, 2017). The remaining variables do not exert statistically significant effects. From the pairwise comparisons carried out it appears that for the 1st independent variable the distribution of the group of people who have traveled on the line more than 10 times in their life differs significantly both from the distribution of the group of people who have traveled 1-3 times (p=0.001) as well as from those who have traveled 4-6 times (p=0.007) (Norris, Qureshi, Howitt, & Cramer, 2017; Roussos & Tsaousis, 2020). We conclude that the degree of satisfaction is stronger among passengers who have traveled more than 10 times on this particular line.

Also, for the 2nd independent variable the distribution of the group of people who have traveled on the line, in the last 2 years (2021-2022) more than 6 times in their life differs significantly from the distribution of the group of people who have traveled 1-2 times (p=0.000), from those who have traveled 3-4 times (p=0.029) and from those who have never traveled (p=0.000) (Norris, Qureshi, Howitt, & Cramer, 2017; Roussos & Tsaousis, 2020). It is obvious that the degree of satisfaction is stronger among passengers who have traveled more than 6 times on this line.

Finally, it appears that for the 3rd independent variable the distribution of the group of people who have traveled for business reasons, on the S-A line, differs significantly both from the distribution of the group of people who have traveled for leisure (p =0.024), as well as from that which they have traveled to cross the Samaria gorge (p=0.006) (Norris, Qureshi, Howitt, & Cramer, 2017; Roussos & Tsaousis, 2020). We conclude that the degree of satisfaction is stronger among passengers who have traveled for business reasons on this line.

6. Discussion and conclusions

The main purpose of this paper was to analyze passengers' socio-economic characteristics, market conditions, and attitudes of Cretan residents (mainly the residents of the Prefecture of Chania) towards the quality of services provided on the coastal shipping routes of southwest Crete. As a case study we used the coastal line "Sfakia-Agia Roumeli" (S-A) and the main shipping company in the area (CC). Structured questionnaires were distributed, and we collected a sample of 260 respondents, predominantly aged between 25 and 54. Most of them live in urban areas in the city of Chania, work as employees in the private sector, are married and have no children. Basically, they are high school graduates and graduates of higher education. The first half of respondents have traveled on this line 1-3 times in their life while the second half haven't, in the last two years (2021-2022). The most important reason for these trips was leisure. Most passengers travel on this route together with their family, without being accompanied by a vehicle.

Table 5 – Appropriate inferential tests between the dependent and independent variables of the research and results (gray surfaces show statistical significance differences)

Research Question	Factor List (independent variables)	Dependent Variable: General satisfaction with the company		
		Inferential Tests	*Statistically significant result*	*Results interpretation*
RQ:6	*Gender*	Mann-Whitney U test	-	-
RQ:6	*Travel with family*	Mann-Whitney U test	-	-
RQ:6	*Travel by vehicle*	Mann-Whitney U test	U=4763, p=0.001	Passengers who travel with their vehicle are more satisfied with CC on the S-A line
RQ:7	*Educational level*	Kruskall Wallis H test	-	-
RQ:7	*Age*	Kruskall Wallis H test	-	-
RQ:7	*Work area*	Kruskall Wallis H test	-	-
RQ:7	*Profession*	Kruskall Wallis H test	-	-
RQ:7	*Marital status*	Kruskall Wallis H test	-	-
RQ:7	*Number of children*	Kruskall Wallis H test	-	-
RQ:8	*Total number of trips on the S-A line*	Kruskall Wallis H test	H(3)=14.719, p=0.002	The degree of satisfaction is stronger among passengers who have travelled more than 10 times on the S-A line
RQ:8	*Number of trips on the S-A line in the last two years*	Kruskall Wallis H test	H(3)=27.053, p=0.000	The degree of satisfaction is stronger among passengers who have travelled more than 6 times on the S-A line, in the last two years
RQ:8	*Reason for traveling on the S-A line*	Kruskall Wallis H test	H(3)=10.658, p=0.014	The degree of satisfaction is stronger among passengers who have travelled for business reasons on the S-A line

Source: Our elaboration, 2023.

Assessment criteria for the quality of services provided were "route reliability", "pricing policy", "comfort on-board", "Land and on-board services" and "Preference to CC over potential competition". The descriptive analysis showed in general that the greatest dissatisfaction of the respondents is expressed for the "pricing policy", the highest acceptance for the "land and on-board services", while no satisfaction is expressed by the participants in any category. Based on the percentage of respondents' answers from "not at all" to "moderately", the dynamics of their objections in descending order are: 1. Preference for CC over potential competition, 2. Pricing policy, 3. Comfort on-board and Safety, 4.

Route reliability, 5. Land and on-board services. This means that while our research agrees at a general level with the existing literature on the qualitative factors that influence passengers' attitudes, it disagrees about the most important of them. The "land and onboard services" factor is not found as primary in Yuen & Thai (2015) Lekakou et al. (2011) Kahn et al. (2018). Of course, these surveys do not refer to the coastal shipping lines of southwest Crete.

The elements that most concern the respondents and would possibly choose a competing company instead of CC are the age of the ships, the high prices of passenger tickets, the long duration of the trip, the problematic frequency of the trip and the feeling of insecurity on-board. According to passengers, the most important quality factors are safety on-board, route frequency, departure-arrival time, journey time and Comfort on-board. In relation to Profillidis' point of view, the first (safety) and the third position (route reliability-departure and arrival time) of the quality factor rankings formulated by him are confirmed. Differentiation is observed on the one hand in the second place as the research showed flexibility (route frequency) and not the journey time (4th place) and on the other hand in the fifth place where the comfort is located (and not the flexibility).

On a percentage scale, 87.5% of respondents are willing to pay an increase of 0.01-3€, 66.3% an increase of 3.01-6€ and 45.5% an increase of 6.01-9€ for a modern ship, closed-type, with improved services provided and maintaining the same journey duration. These rates increase significantly by adding the assumption of halving the travel time. In relation to the rest of the lines in southwest Crete, the dynamics of respondents' objections to the quality provided, in descending order, is recorded as follows: 1. Palaiochora-Loutro, 2. Sfakia-Gavdos, 3. Agia Roumeli-Sougia, 4. Agia Roumeli-Palaiochora. The general level of respondents' satisfaction with CC, on the coastal line S-A, revealed no dissatisfaction, but only relative satisfaction.

The non-parametric "Mann-Whitney" test showed that there is no statistically significant difference in the mean rankings (or medians) of the groups related to the variables "gender" and "travel alone or with family". Only for the variable "travel with or without a vehicle" was the result statistically significant. This is a small effect. It appears that passengers who travel with their own vehicle are more satisfied with CC than those who do not travel with it. The non-parametric test "Kruskall Wallis" clarified that only the "total number of trips on the S-A line", the "number of trips on the S-A line, in the last two years", and the "reason for traveling on the line" affect the general degree of passenger satisfaction". The degree of satisfaction is stronger for passengers who have traveled more than 10 times in their life on this line, for passengers who have traveled more than 6 times in the last two years and for passengers who have traveled for business reasons.

As a result, there is plenty of room for more in-depth research in the future. We expect that our findings will contribute to existing information and broaden the analysis to similar tourism locations worldwide. Shipowners can apply the previous investigation, which has managerial consequences. For example, on heavily seasonal coastal routes, it may emerge passengers' attitudes about the quality of the services provided. This can assist coasters streamline their company strategic plan and establish effective marketing policies to attract passengers. Also, there are some theoretical implications. Confirmatory factor analysis could be used to deepen the analysis by identifying the relevant continuous variables for further inferential tests. The same analysis could be extended to other means of transport such as the plane, the railway and of course the cruise.

The specific research, although it is innovative for the region of southwest Crete, could undergo specific improvements. Over time, several passenger satisfaction surveys have emerged in the transportation industry. This should have led us to the confirmatory factor analysis to confirm the correctness of the selection of all questions per assessment axis (scale) and to see which of the axes (scales) best fit the data we have. In fact, because on the one hand the questionnaire of the present research was synthesized from other similar questionnaires and on the other hand similar research has not been carried out on the S-A coastal line in the past, perhaps the exploratory factor analysis would be a good choice too. It would lead to the appropriate continuous variables for the inferential tests on the survey data. Thus, one way or another, using the multiple regression approach, could be helpful to estimate the overall degree of individual's satisfaction with CC, the real factors' overall predictive power for assessing the quality of the provided coastal services, and their relative importance. Moreover, the study might be expanded to include the summer months, taking into account the opinions of both the tourists and the Cretans as a whole. From a statistical perspective, the respondents' sampling could be probabilistic.

Referenes

1. Akinola, R., & Okundalaiye, H. (2022). Management control system in multinational environment: A critical review. *International Journal of economic behavior*, 12(1), 145-158. doi:10.14276/2285-0430.3434
2. Anastasiadou, S. (2012). *Statistics and research methods in social sciences*. Athens: Kritiki.
3. Babbie, E. (2018). *An introduction to social research* (2nd ed.). Athens: Kritiki.
4. Bartlett, J., Kotrlik, J., & Higgins, C. (2001). Organizational research: Determing appropriate sample size in survey research. *Information technology, learning, and performance journal*, 19(1), 43-50.
5. Boile, M., Theofanis, S., Perra, V.-M., & Kitsios, X. (2023). Coastal shipping during the pandemic: Spatial assessment of the demand for passenger maritime transport. *Frontiers in future transportation*, 4, 1-7. doi:10.3389/ffutr.2023.1025078
6. Chalkos, G. (2020). *Statistics. Theory and practice*. Thessaloniki: Disigma.
7. Cole, S. (2005). *Applied transport economics*. London: Kogan page limited.
8. Dancey, C., & Reidy, J. (2020). *Statistics without mathematics*. Athens: Kritiki.
9. Dimitriadis, E. (2016). *Business statistics with applications in SPSS and Lisrel* (2nd ed.). Athens: Kritiki.
10. Drozhzhyn, O., Koskina, Y., & Tykhonina, I. (2021). Liner shipping: the evolution of the concept. *Scientific journal of maritime research*, 35, 365-371. doi:https://doi.org/10.31217/p.35.2.18
11. Fafaliou, I., & Polemis, M. (2010). Competitivenss in the coastal ferry boat industry: evidence from Greek SMEs. *Global business & economics anthlogy*, II(2), 20-31.
12. Gnardellis, C. (2013). Data analysis with IBM SPSS Statistics 21. Athens: Papazisis.
13. Gnardellis, C. (2019). *Applied Statistics* (2nd ed.). Athens: Papazisis.
14. Goulielmos, A., & Sitzimis, I. (2014). The Liberalization process of the Ferry System in Greece, 2001-2009: What have been the benefits to users of Aegean Sea Transportation? *Spoudai Journal*, 64(4), pp. 39-66.
15. Grigoroudis, E., & Siskos, Y. (2004). A survey of customer satisfaction barometers: some results from the transportation-communications sector. *European journal of operational research*, 2(152), 334-353.

16. Hejazi, M., & Fawzy, M. (2021). Passengers' satisfaction of the service quality at saudi international airports. *International journal of economics, commerce and management*, IX(8), 198-217.

17. Hensher, D., Stopper, P., & Bullock, P. (2003). Service quality-developing a service quality index in the provision of commercial bus contracts. *Transporation research* Part A(37), 499-517.

18. HSA. (2000-2022). *Passengers embarked, by ports (coastal - ferries traffic) in Greece*. Athens: Hellenic Statistical Authority.

19. Kahn, M., Hadiuzzaman, M., Das, T., Rahman, F., & Shimu, T. (2018). A structural equation approach in modeling perceived service quality of passenger ferry. *Management research and practice*, 10(1), 42-63.

20. Kouhihabibi, M. (2021). Feeling the pulse of trade in the age of corona: artificial intelligence and e-commerce. *International Journal Of Economic Behavior*, 11(1), 23-35. doi:10.14276/2285-0430.2904

21. Lacobucci, D., Ostrom, A., & Grayson, K. (1995). Distinquishing service quality and customer satisfaction: the voice of the consumer. *Journal of consumer psychology*, 4, 277-303.

22. Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4. doi:https://doi.org/10.3389/fpsyg.2013.00863

23. Lekakou , M., Pallis, A., Vaggelas , G., & Vitsounis , T. (2011). "*Users speak: Coastal shipping services and islanders perception*. European Conference on Shipping Intermodalism and Ports. Chios.

24. Norris, G., Qureshi, F., Howitt, D., & Cramer, D. (2017). *Introduction to statistics for the social sciences with SPSS*. (C. Emmanouilidis, Ed.) Athens: Kleidarithmos.

25. Pantouvakis, A. (2010). The relative importance of service features in explaining customer satisfaction. *Managing service quality: An international journal*, 20(4), 366-387.

26. Profillidis, V. (2016). *Transport economics*. Athens: Papasotiriou.

27. Qin, H., & Prybutok, V. (2009). Service quality, customer satisfaction, and behavioral intentions in fast-food restaurants. *International journal of quality and service sciences*, 1, 78-95.

28. Roussos, P., & Tsaousis, J. (2020). *Applied statistics in social sciences using SPSS and R*. Athens: Gutenberg.

29. Sambrakos, E. (2018). *Transport economics*. Athens: Varvarigou.

30. Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods in business and economics*. Athens: Disigma.

31. Schindler, P. (2019). *Research methods in business*. Athens: Kritiki.

32. Senic, V., & Marinkovic, V. (2014). Examining the effect of different components of customer value on attitudinal loyalty and behavioral intentions. *International journal of quality and service sciences*, 6, 134-142.

33. Sitzimis, I. (2021a). An implementation proposal of innovative pricing in Greek coastal shipping. *Oradea journal of business and economics* (*OJBE*), 6(2), 69-77. doi:http://doi.org/10.47535/1991ojbe130

34. Sitzimis, I. (2021b). An optimal forecasting method of passenger traffic in Greek coastal shipping. *International Journal of Business and Economic Sciences Applied Research* (*IJBESAR*), 14(3), 72-87. doi: 10.25103/ijbesar.143.05

35. Sitzimis, I. (2021c). Pricing and market results of Greek coastal system after cabotage privilege removal (2002-2010): The example of European and global aviation.

Business & Entrepreneurship Journal, 10(2), 1-24. doi:https://doi.org/10.47260/bej/1021

36. Sitzimis, I. (2022). Economies of scale in Greek coastal shipping. A survivor analysis. *European Transport/ Trasporti Europei*, 88(7). doi:https://doi.org/10.48295/ET.2022.88.7

37. Tyrinopoulos, Y., & Aifadopoulou, G. (2008). A complete methodology for the quality control of passenger services in the public transport business. *European transport*, 38, 1-16.

38. Yuen, K., & Thai, V. (2015). Service quality and customer satisfaction in liner shipping. *International journal of quality and service sciences*, 7(2/3), 170-183.

39. Zafeiropoulos, K. (2015). *How to do a scientific paper* (2nd ed.). Athens: Kritiki.

HOW DO WE EVEN TRUST?
A CRITIQUE OF ECONOMIC APPROACHES ON TRUST FORMATION

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Abstract

The aim of this paper is to provide a review of trust formation models in early economic accounts and behavioral accounts of trust. Drawing on foundational theories of trust across several disciplines in the social sciences and empirical studies, I critically examine their assumptions and implications to identify the theoretical and conceptual gaps within each approach. I argue that neither approach explains successfully trust formation in interactions between individuals, due to a lack of clarity and robustness in defining trustworthiness and inadequately accounting for the role of trustworthiness expectations. Beliefs about others' trustworthiness are central to trust. A robust account of trust formation must explain how we form such beliefs. To this end, this paper outlines an epistemological account of trust formation, meant to provide a more cohesive understanding of trust dynamics at the individual level.

1. Introduction

Friends or strangers – we trust others every day. Trust is beneficial for our well-being, our relationships and society in general. Some people we trust blindly, many others – we ponder whether to trust them or not. Trust is risky, so we must invest it wisely, particularly when things that are important to us depend on others. The question is: what makes us trust others and how do we know our trust is warranted?

Early accounts of trust stemming from sociology, political science, and social psychology, use the standard, neoclassical rational choice model to answer this question. Assuming rational actors are utility-maximizing, self-interested individuals, early "economic" accounts of trust investigate if trust is rational. They lock together the concepts of trust, interests, and cooperation via the notion of individual rationality used in the

standard rational choice model. Trust reflects a strictly cognitive expectation about the trustworthiness of others, which results from the subjective probability calculation that others would be interested in reciprocating our trust.

Behavioral economists argue against the notion of individual rationality used in early economic accounts of trust. They show that ordinary people rarely behave like rational self-interested individuals. They often trust without being able to form expectations about others' trustworthiness. In fact, trust is emotionally wired. Does that make us all irrational? If trust does not necessarily rely on expectations about trustworthiness, then what determines it? Behavioral economists hypothesize that trust might have to do with social preferences, the expressive function of trust, or merely with the fact that our rationality is bounded. They took an entirely different path in explaining trust compared to early trust scholars, but in the process, they conflated trust with cooperative behaviors.

In this paper, I question the notions of trust and trustworthiness used in early economic accounts and behavioral accounts of trust. I argue that neither approach explains trust formation successfully. Trust formation refers to the process through which a truster forms an expectation about the trustworthiness of the trustee. This expectation reflects the truster's belief that the trustee is trustworthy. Based on this belief, the truster may eventually decide whether to cooperate with the trustee or not. Early economic accounts of trust provide an incomplete explanation of how individuals form such expectations whereas behavioral accounts tend to elude the role of trustworthiness expectations in trust-taking.

Expectations about others' trustworthiness are inherent in trust. An adequate explanation of trust formation must investigate how people form justified beliefs about the trustworthiness of others. To this end, I provide an epistemological account of trust formation where expectations about trustworthiness form based on assessments of the trustees' competence, predictability, and responsiveness.

The paper is structured as follows. Section 2 briefly presents the methodology I used to build my research. Section 3 presents a critique of early economic accounts and behavioral accounts of trust, as well as an attempt at integrating the two approaches. In Section 4, I outline my epistemological account of trust formation. In Section 5, I conclude and briefly discuss the implications of my account, its limitations, and further research avenues.

2. Methodology

Rather than using a conventional literature review, I organized my paper around a thematic critique of early economic accounts and behavioral accounts of trust. This method enables a targeted examination of the theoretical and conceptual gaps within both approaches and is suitable to highlight the competing intuitions on the definitions of trust. I systematically compare the assumptions and implications within both approaches. This way, I prepare the stage for a more cohesive understanding of trust dynamics at the individual level. Anchoring my account in methodological individualism, I focus on the micro-level processes that lead to trust formation from an epistemological point of view. I pinpoint the elements of an epistemological explanation on how individuals form expectations about the trustworthiness of those they interact with, outside the rational choice framework. I develop my account based on the definition of trustworthiness I provide in Banu (2023).

The selection of studies I incorporate in the analysis covers several disciplines in the social sciences. It includes foundational theories of trust by scholars such as sociologist

James Coleman (1990), political scientists Diego Gambetta (1988) and Russell Hardin (2002), and social psychologist Toshio Yamagishi (1998). The common thread in their works is the use of the standard rational choice model to explain trust formation. The critical examination naturally extends to behavioral economics. I review key experimental studies to illustrate how the understanding of trust determinants has shifted in behavioral economics. I start with Berg *et al.* (1995), who designed the experimental research into trust. I then identify clusters of empirical studies which advance various determinants of trust (for instance, social preferences or expressive trust) and I critically discuss their implications on the definition of trust.

3. The economics of trust

3.1 Early economic accounts of trust

Two hunters, *A* and *B*, must decide whether to hunt a stag together or catch a hare on their own. The stag is more rewarding, but hunting it requires the effort of two individuals. The issue is if they can trust each other. If *A* trusts *B* to hunt the stag but *B* goes rogue and catches the hare, then *A* gets nothing. The same goes for *B*. Rousseau first discussed this dilemma of the "stag hunt" in *Discourse on inequality* (1993 [1755]). It later became known as the "trust game" or the "assurance game."

There are two Nash equilibria in the game (Fig. 1): the optimal equilibrium where *A* and *B* cooperate and hunt the stag, and the sub-optimal equilibrium where each goes for the hare. In the standard rational choice model, rational individuals seek to maximize their utility by pursuing self-interest. On this assumption, both players in the trust game would prefer cooperation, but it can only work if they trust each other. Otherwise, the rational choice is to catch the hare. Early trust scholars in sociology (e.g., Coleman, 1990), political science (e.g., Gambetta, 1988; Hardin, 2002), and social psychology (e.g., Yamagishi, 1998) draw on the insights of the trust game and its assumptions to study trust. They conclude that trust is rational if: (i) cooperation is the strategy that brings the best possible results, and (ii) the trustee is trustworthy.

Figure 1 – Payoff matrix in the stag hunt game

		B	
		Hunts the stag	Hunts the hare
A	Hunts the stag	4, 4	0, 3
	Hunts the hare	3, 0	3, 3

This conclusion bears implications on the definition of trust. First, trust is intrinsically linked to rational choice. Early accounts ground it in self-interest via the notion of individual rationality used in the standard rational choice model. As Gambetta (1988, p. 222) put it, trust "is a matter, … also of interest." Interests "govern action independently of a given level of trust, but it can also act on trust itself by making behavior more predictable." To Coleman (1990, p. 99), trust is rational if the ratio between the probability that the trustee will cooperate and the probability that she will not is higher than the ratio

of potential losses and gains. The second implication is that expectations about others' trustworthiness are central to trust. Early trust scholars take trust to reflect the belief that the trustee is trustworthy. Player A must figure out if trusting B allows her to pursue her interest. In early accounts, a trustworthy trustee is simply one that will answer favorably to our trust. She "will perform an action that is beneficial or at least not detrimental to us" (Gambetta, 1988, p. 217). The third implication is that trust is purely cognitive. To assess the trustee's trustworthiness, a truster relies on the assumption that the trustee is a rational agent. A rational agent will choose the strategy with the highest payoff. In the trust game, the truster has complete information about the trustee's payoffs and possible strategies. She can calculate and anticipate the probability that the trustee will cooperate.

There are three issues here. First, real people rarely act in conditions of full certainty, have limited cognitive skills, and their decisions are heavily context dependent. The claim that they make perfectly rational decisions is unfounded and discounts the context and uncertainty in real deliberative processes. Kahneman & Tversky (1979) show that human decision-making is biased and follows simplistic cognitive shortcuts. We are not good at estimating probabilities or making predictions. Because we are "boundedly rational," we look for our decisions to satisfy our preferences, not to maximize them (Simon, 1997). The point is to reach a "good enough" decision based on the available information. Early trust scholars recognize the uncertainty involved in trust (Gambetta, 1988; Yamagishi, 1998). Yet, they still hold trust and trustworthiness to the high standard of individual rationality and decision-making in the standard rational choice model.

Second, if trustworthiness is contingent on payoffs, then the concept expresses a simplistic notion of merely being reliable when it pays off. But one can be reliable without necessarily being trustworthy. In his theory of trust as encapsulated interest, Hardin (2002, p. 28) argues that a robust definition of trust must account for the motivations of the trustee to fulfill the trust. He argues that interests are the central motivation for trustworthiness because interests motivate most of our encounters. Other motivations cannot enable "systematic accounts of trust" (2002, p. 52). However, Hardin admits that one is not trustworthy simply because they have an interest to pursue in their relationship with us. To him, "I trust you" means that I think that it is in your interest to consider my interests, that is, to encapsulate them into yours, because you value the relationship with me, and you wish for its continuation.

The issue in Hardin's theory is that his notion of interest is compatible with various reasons people may have for trustworthiness, like "love or friendship and the caring for another" (2002, p. 24). "At a minimum, you may want our relationship to continue because it is economically beneficial to you … In richer cases, you may want our relationship to continue and not to be damaged by your failure to fulfil my trust because you value the relationship for many reasons, including nonmaterial reasons" (2002, p. 4). Allowing interests to match this wide spectrum of reasons for trustworthiness, the notion itself becomes too loose. One could easily interpret almost any kind of reason for trustworthiness as belonging to interests. Like this, we will not be able to differentiate between different motivations for trustworthiness.

A robust theory of trust must allow us to do that if we want to understand trust in all its shapes and forms. Trust is dynamic, it is complex and versatile. The trust I have in my friend is different from the trust I have in my sibling or a work colleague. In each of these relationships I trust people with things that are specific to that relationship. I will not confide in my work colleague as I confide in my friend. We must account for the context-

dependency of trust and its determinants from one context to another. This includes the different reasons the trustees may have for trustworthiness, if the truster finds those reasons relevant enough to trust, and how she assesses them. People have multiple reasons to fulfill others' trust, beyond interests. Sometimes, interests go hand in hand with moral commitments or sympathy. Other times, pursuing our interests might mean not being able to keep a promise or fulfill a commitment.

The final issue is that early economic accounts of trust cannot explain social or generalized trust. Social trust refers to trust we have in general others, including strangers. In the standard rational choice model, trust in strangers is irrational because we know little about them and we cannot form expectations about their trustworthiness. Generalized trust can only happen in small, close-knit communities (Williams, 1988, p. 12), with tight social relations, repeated interactions, and easily accessible information about others, even if from third parties (Hardin, 2002, p. 21). Now, the social sciences took an interest in trust precisely because social trust is assumed to foster economic prosperity (Knack & Keefer, 1997; Zak & Knack, 2001) and democracy (Putnam, 1993; Warren, 2018). Trust in strangers can solve social dilemmas.

The issue is, are we all irrational to trust strangers? In his emancipation theory of trust, Yamagishi (1998) manages to explain trust in strangers within the rational choice framework. He points to trustfulness rather than trustworthiness as an antecedent of trust. Trustfulness is a disposition to trust in general, different from generalized expectations about trustworthiness (1998, p. 46). It is relevant in situations of high social uncertainty because it drives us to engage in new interactions with people whom we have little information about. In Yamagishi's view, this is rational because it allows us to pursue our interests (1998, p. 67-68). We may subjectively think that interests do not motivate our trusting others, yet we benefit from trust, directly or indirectly. In this sense, Yamagishi maintains trust in the standard rational choice framework.

To Yamagishi, expectations about trustworthiness still play a role in trust formation. High trusters are not simply naïve. They are "good at understanding the minds and characters of other people" (1998, p. 132), and can "read" cues of untrustworthiness better than low trusters. There are two issues with Yamagishi's theory, though. First, he does not explain what cues we use to assess others' trustworthiness, particularly when we deal with strangers. Second, the notion that trust is rational because it *eventually* secures our interests is not a satisfying explanation. If we want to understand trust drivers, we should be able to explain the subjective deliberative processes of individuals and how expectations about others' trustworthiness affect them.

3.2   *Behavioral accounts of trust*

Behavioral economists use laboratory experiments to show that the standard rational choice model does not adequately predict trust. Berg *et al.* (1995) are among the first to test the trust game in experimental settings. They designed the so-called "investment game" to measure differences in trust and trustworthiness among individuals. The game reflects an economic exchange where trust is assumed to be the main driver of investment decisions. The game is played once, under full anonymity. This way, researchers control for other variables that could influence investment decisions, like reputation or sanctions.

In the game, two subjects, *A* and *B*, receive an equal sum of money. *A*, the investor, must decide whether to keep the money or transfer it all or part of it to *B*. If *A* decides to

invest, *B* must make a similar choice. The experimenter triples each transfer or "investment." Both players are aware of the outcomes of their possible choices. If economic agents are interested only in their own gains, there is no rational reason for *A* and *B* to transfer money to each other (that is, cooperate). *B* gains nothing by transferring money back to *A*. *A* anticipates this and makes no initial investment. Although both players could increase their earnings if they invested, the rational choice for each is to go home with the endowment initially received. Figure 2 illustrates this decision-making situation in sequential form. Both players initially hold 10 dollars. If each invested 5 dollars, each would ultimately gain 20 dollars.

The experiment shows that the standard rational choice model used in the early economic accounts cannot predict people's trust-taking behaviors. Over 90% of "investors" chose to invest, and many of trustees in *B*'s role reciprocated (Berg *et al.* 1995). The hypothesis is that *B* transfers money back because she interprets *A*'s behavior as trust. Replications of the game in various countries and varying experimental settings produced similar results (e.g., Ortmann *et al.*, 2000; Koford, 1998; Willinger *et al.*, 1999; Snijders & Keren, 1998).

Figure 2 – The investment game
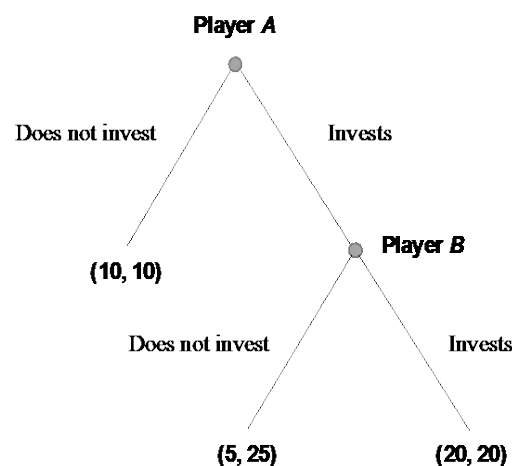
The implications of behavioral studies on the notion of trust oppose those of early economic accounts. First, trust does not necessarily reflect expectations about others' trustworthiness. People trust in the absence of such expectations. The investment game is usually played in full anonymity, so player *A* cannot assess and predict *B*'s trustworthy behavior. In early economic accounts, *A*'s decision to invest is irrational. Yet, a high percentage of people do it. Behavioral economists conclude that the concept of rationality in the standard rational choice model is wrong. Second, if trust does not reflect trustworthiness expectations, it belongs to the realm of decisions, actions, or behaviors. Some behavioral economists even separate cognitive trust from behavioral trust. Fetchenhauer *et al.* (2017, p. 140) argue, "trust at the cognitive level is not identical to trust at the behavioral level. The two are dissociated, and that can lead to patterns of thought and behavior suggesting, somewhat paradoxically, that people trust both too little and too much at the same time, depending on the level of trust one is focusing on."

Finally, trust-taking relies on emotions "in addition to economic considerations concerning monetary outcomes" (Engelmann & Fehr, 2017, p. 34). Failure to reciprocate

trust triggers an emotional reaction called betrayal or exploitation aversion. This is a form of social anxiety that inhibits cooperative behaviors (Fehr *et al.*, 2005; Bohnet & Zeckhauser, 2004; Fehr, 2009). It emerges when betrayal seems to be intentional (Bohnet *et al.*, 2008). Pharmacological studies further explore how emotions mediate trust-taking by administering oxytocin to subjects in the investment game (e.g., Kosfeld *et al.*, 2005; Baumgartner *et al.*, 2008; Mikolajczak *et al.*, 2010; De Dreu *et al.*, 2010; Van IJzendoorn and Bakermans-Kranenburg, 2012; Zhong *et al.*, 2012). Oxytocin regulates bonding with offspring and sexual partners (Churchland 2011). It influences social behavior (Skuse & Gallagher, 2009; Meyer-Lindenberg *et al.*, 2011) and facilitates social cognition (Kirsch *et al.*, 2005; Domes *et al.*, 2007a; 2007b; Guastella *et al.*, 2008; 2010). Kosfeld *et al.* (2005), for instance, show that oxytocin enhances trust-taking behaviors. Investors in the treatment group transferred money 45% of the time compared to 21% in the control group. The effect disappeared when subjects played the game with a computer.

Behavioral economists investigated what drives trust in the absence of expectations about trustworthiness. Some argue that trust reflects the agents' social preferences, like aversion to inequity (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000), concern for social welfare (Charness & Rabin, 2002; Andreoni & Miller, 2002), or reciprocity (Rabin, 1993; Chatterjee *et al.*, 2019). The issue with these models is that choices are driven by anticipated outcomes. There is no investigation of the intentions or decision-making processes underlying trust-taking (McCabe *et al.*, 2003; Krueger *et al.*, 2017). The models are more suitable to explain trustworthiness rather than trust. Other studies focus on the expressive function of trust. The act itself and its meaning seem to motivate trust-taking. Trust involves a complex association of beliefs, norms, and emotions (Fetchenhauer *et al.*, 2017). Dunning *et al.* (2012; 2014) argue that trust is about compliance with an injunctive norm. Individuals feel like they have a social obligation to trust, associated with fulfilling a duty or social responsibility, whereas distrust is associated with guilt or anxiety. Yamagishi *et al.* (2015) argue that trust may be motivated by a preference related to one's own identity – we wish to perceive ourselves as trustful individuals. Newer studies show that trust is neither fully rational nor fully expressive. The decision to trust reflect the agents' "bounded rationality" (Evans & Krueger, 2016). Krueger *et al.* (2017, p. 122) explain that the truster simply compares possible gains and losses. She estimates the probability that the trustee will reciprocate by projecting her own prosocial orientation onto the trustee. This assessment is limited because it is difficult for the truster to assess the trustee's motives and work with probabilities optimally. This is a quick, egocentric, and heuristic strategy that allows the truster to make a "good enough" decision.

There are two issues with the definition of trust and trust formation in behavioral economics. First, behavioral economists discount the role of expectations about trustworthiness in trust-taking. This leads to the paradoxical situation where one can trust at a behavioral level without believing that the other is trustworthy. Trust must involve at least a minimal degree of belief about others' trustworthiness. Otherwise, what we call "trust" may simply be a cooperative behavior. Behavioral economists assume that, if *A* trusts *B*, then *A* will cooperate with *B* and, if *A* cooperates with *B*, then it means that *A* trusts *B*. Trust is not a necessary condition for cooperation, though.

Second, there is no insight on the trusters' subjective experience in trust-taking. We do not know what eventually determines trust and the decision-making processes associated with it. The accounts above do not separate the payoff matrix from the agents' subjective experience, that is, how they perceive and interpret the objective structure of the

trust problem (Rompf, 2015). In real life, people assess trustworthiness based on certain cues, and these assessments are intrinsically linked to the context of the trust situation and the object of trust, that is, the things we trust others with. Explanations of trust formation should focus how people form expectations about trustworthiness, beyond material outcomes. Subjective probabilities are a consequence of the actors' beliefs and desires, their worldview, and their perceptions of those around them (Castelfranchi & Falcone, 2000, p. 6). Trust influences actors' perceptions on the possible gains from cooperation. To understand how, we must first explain how beliefs about trustworthiness form.

3.3   *An integrative account of economic approaches on trust*

Rompf (2015) integrates the competing explanations of trust formation in early economic accounts and behavioral accounts. Considering that rationality is flexible and adaptive, he uses the "dual process paradigm" to explain that "human cognition may occur in either a rational or an automatic mode" (2015, p. 157). The automatic mode involves minimal cognitive effort, is unconscious, and relies on intuition, readily available associations, and heuristics. The rational mode uses complex, explicit, conscious, inferential, and controlled reasoning. The former is fast, emotional, associative, and learns slowly (Kahneman, 2011). The latter is slow, sequential, consciously monitored, voluntarily controlled, and requires cognitive effort (Kahneman, 2011).

To explain trust formation, Rompf argues that subjects interpret the trust situation via mental trust-related schemata. These are "(1) frames, that is, mental models of typical situations, and (2) scripts, broadly understood as 'programs of behavior'" (Rompf, 2015, p. 198). Frames largely belong to common knowledge. They are socially and culturally shared. Activation of a frame triggers certain scripts or behavioral patterns. The "sufficiency principle" and "effort-accuracy tradeoffs" govern the selection between the automatic and rational mode of information processing via frames and scripts. Unconditional trust, that is, "trust without doubtful and conscious elaboration" (Rompf, 2015, p. 216) uses the automatic mode of information processing. Conditional trust, where "the trustor subjectively faces the trust problem and elaborates on his future course of action" (Rompf, 2015, p. 216), activates the rational mode. Expectations about trustworthiness form only in conditional trust (Rompf, 2015, p. 224). Situational cues derived from communication, identity signaling, and impression management help the formation of such expectations.

Rompf provides a more coherent account of the link between trust and rationality. The shortcoming in his model is the lack of a clear and complete definition of trustworthiness and how we form such expectations about others. A robust explanation of trust formation should map the criteria and the information based on which we form trustworthiness expectations, as well as the factors that influence the belief formation processes. It should also cover unconditional trust. While the cognitive processes involved in it are quick, thin, unconscious, and prone to errors, it does not mean that trustworthiness expectations are absent. If they were, we would not be talking about trust. The fact that they form spontaneously does not absolve us from the task of understanding how they form. Rompf's model cannot explain, for instance, why a smile is enough to trust in certain contexts, while in others we need more solid evidence.

The analysis of early economic and behavioral accounts of trust, as well as Rompf's attempt at integrating the two, highlights a significant gap in how trust and trust formation have been conceptualized. That is the failure to adequately define trustworthiness and

account for the expectations of trustworthiness that are integral to trust. Early economic accounts reduce trust to the calculation of risks and outcomes based on rational choice theory and present a simplistic notion of trustworthiness. Behavioral models introduce psychological avenues to explain trust at the behavioral level but overlook the belief forming processes underlying trust-taking. Rompf provides a notion of individual rationality that is more suitable to explain individual decision-making in trust situations. But his account still falls short to explain how individuals form and justify their beliefs about the trustworthiness of others. These shortcomings point to the need of separating trust from rational choice and exploring trust formation from an epistemological perspective. In this perspective, an account of trust formation should focus on the reasons that justify the belief that one is trustworthy. This belief can indeed determine trust-taking, but it need not lead there. Reasons for cooperation, like the anticipation of certain outcomes, should not be conflated with reasons for believing one is trustworthy.

An epistemological account of trust formation addresses these shortcomings by focusing on the nature and justification of beliefs about trustworthiness. Such an account should integrate cognitive, emotional, and contextual factors that influence how beliefs are formed and adjusted considering new evidence or experiences. By examining the mechanisms through which individuals assess trustworthiness, an epistemological approach can provide a more comprehensive framework for understanding trust. This framework not only considers the logical and empirical grounds upon which trust-related beliefs are based but also incorporates the socio-cultural dimensions that influence these processes. Thus, moving towards an epistemological model of trust formation not only bridges the conceptual gaps identified in existing theories. It also enriches our understanding by highlighting the complex interplay of factors that underpin trust in dynamic social interactions.

4. The epistemology of trust

An adequate explanation of trust formation must account for the information that feeds into the belief formation processes about the trustworthiness of others. It must define the criteria based on which trusters assess available information, the psychological and contextual factors that influence beliefs about trustworthiness, as well as when they are well-grounded or justified.

My account of trust formation relies on the definition of trustworthiness which I propose in Banu (2023). I argue there that one is trustworthy if she is competent, predictable, and responsive with respect to the thing that we trust her with (the object of trust). Competence means possessing the necessary abilities to fulfill one's trust with respect to something, as well as the capacity to assess and choose the optimal way to apply those abilities in fulfilling the trust. Predictability means both being reliable and having the relevant reasons to fulfill one's trust with respect to the object of trust. Responsiveness captures the trustee's intentionality about or directed at the truster, her willingness to meet the truster's needs with respect to the object of trust. These criteria provide the necessary and sufficient conditions for trustworthiness assessments. While they apply to any trust situation, my account acknowledges that specific information that feeds into the assessment of each criterion will vary with context. Competence, predictability, and responsiveness mean different things in different trust situations.

My account of trust formation rests on the following prerequisites. First, uncertainty is inherent in trust formation. The available information about others is always incomplete and imperfect. Second, trust is a three-place predicate of the form "*A* trusts *B* with *X*." That is, trust is specific to a certain object, it does not simply describe *A*'s general trust in *B*. *A*'s assessment of *B*'s trustworthiness is particularized to the object of her trust in *B*. Third, trust is highly context-dependent, and it varies in time. The three-place formula above must be restated as: "*A* trusts *B* with *X* in context *C*, at time *t*" (Bauer & Freitag, 2018, p. 16). Finally, trust reflects a degree of belief about another's trustworthiness. My account allows for instant or spontaneous trust, but not complete or "blind" trust. The latter amounts to faith, which is evidently different from trust.

The information we gather about others from different sources constitutes the input of our assessments about their trustworthiness. We can gather information from (i) direct observations of their actions, behaviors, reactions; (ii) second-person reporting, that is, statements they make about themselves; (iii) the history of interactions and the relationship we have with them; (iv) third-party sources, including reputation; (v) the context of interaction. We ground assessments about others' trustworthiness in cues we collect from all these sources. We may not have access to all sources at the same time. When trusting a stranger, the information we can gather is limited and it is mainly based on the context of interaction. Plus, not all the information we can gather is relevant to assess trustworthiness. The available information is relevant only the extent to which it allows us to assess the trustee's competence, predictability, and responsiveness.

Various psychological factors influence our assessments about trustworthiness, such as our own high or low propensity to trust in general, affects (moods and emotions), heuristics and biases. As high trusters are more optimistic than low trusters (Carver & Scheier, 2018), they will focus their attention on signals of trustworthiness rather than untrustworthiness (Aspinwall *et al.*, 2001). Moods and emotions feed our beliefs about others by "telling" us how we feel about them (Schwarts & Clore, 1988). They provide interpretation patterns based on which we assess the relevance of available information (Jones, 1996, p. 12). Heuristics and biases affect the accuracy of our judgments (Kahneman, 2011). For example, we overestimate intentions or personality traits in observing others' behaviors and neglect situational constraints (Ross, 1977). Contextual factors such as the environment, norms of interaction, and culture can also influence our perceptions of others. Context means the entire set of contingent circumstances that make up a particular situation. It can both inform and influence perception. I may be more inclined to perceive you as trustworthy if I meet you at the university library in the morning rather than on a deserted street at night (Altman Klein *et al.*, 2019, p. 12). Cultural norms and practices provide a framework for understanding and interpreting others' behaviors (Hinton, 2016, p. 148). It distorts to some extent our view of the world (Wilson, 2007).

As imperfect as they may be, perceptions and judgements about others must meet the three criteria of trustworthiness to be able to say that we trust someone. Based on them, we must be able to assess if the trustee is competent, predictable, and responsive with respect to the thing we want to trust her with. The three criteria are necessary and sufficient conditions for trustworthiness. However, depending on the context of trust, one criterion may be more relevant than the others, so it will weigh heavier in our assessments. My trust in my doctor is grounded mainly in her competence. Competence is such an important indicator in this case that I might unconsciously overlook the other criteria. Yet, no matter how competent she might be, I will not trust her if I notice that she treats her patients badly.

That means she is not responsive to the needs of those that rely on her. My account of trust formation does not presume that in real trust situations people consciously and thoroughly assess the three criteria as such. Yet, assessments of others' trustworthiness must meet the three criteria to consider them trustworthy.

Based on the three criteria, the output of A's assessment about B's trustworthiness is the degree to which A trusts B. This is a function of A's degree of belief about B's trustworthiness (with respect to X in context C, at time t). This reflects how certain A is about her belief, that is, about the sufficiency, relevance, and accuracy of the evidence that feeds her belief, and the reliability of the cognitive processes via which she formed that belief.

How do we know our expectations about others' trustworthiness are warranted? What is the acceptable degree of belief above which we are justified to say we trust someone? In the context of trust, warranted means that trust "successfully targets a trustworthy person" (McLeod, 2022, para. 2). Taken as such, this does not tell us much. Plus, there are situations where it seems we have every reason to trust and yet we are disappointed. Does that mean that our trust was not justified? What does justification mean in the context of trust and how do we know we have good grounds for believing that a person is trustworthy?

There is no foolproof answer to these questions. Trust does not reflect a belief in the sense in which we discuss about beliefs in philosophical epistemology. Trust relies rather on a "street-level epistemology" (Hardin, 2002, p. 115). The knowledge involved in it is highly subjective. While we may wish to form true beliefs about others, we do not seek to find out if we can rely on them for the sake of truth, but because we aim to achieve some goals. Trust helps us navigate uncertain social situations and achieve our objectives, without it being instrumental. When we assess trustworthiness, the point is to gather enough information to satisfy, not fulfill, the three criteria for trustworthiness to an extent that we find acceptable. The stakes of the trust situation (how important the object of trust is to us) and the specific circumstances of it define "acceptable." I will not hand over the keys to my apartment to some stranger in the street, but I might trust her to point me correctly to some address that I am looking for.

On this account, warranted beliefs about the trustworthiness of strangers are not impossible to form. They will rely on minimal evidence, drawn from the context of our interactions, and on heuristics. This does not mean that they are completely unreliable. As social beings, we are equipped to observe others and make quick inferences about their intentions or actions. We rely on various cues to form beliefs when we lack solid information. We automatically judge trustworthiness based on appearance or status (Thielmann & Hilbig, 2015), facial expressions (Todorov *et al.* 2005; 2008), or emotions (Dunn & Schweitzer, 2005). Surely, we should not rely too much on the accuracy of such evidence (Uddenburg *et al.,* 2020). However, we form such beliefs and we act based on them all the time, without being aware. As Kahneman (2011) explains, the automatic cognitive mode, which is biased and prone to systematic errors, can produce quite accurate representations in social situations. Plus, it can be trained to solve swiftly and correctly various problems. Trust in strangers may warranted if beliefs about their trustworthiness are calibrated to the stakes and circumstances of the specific trust situation.

5. Concluding remarks

In this paper, I critically examine early economic and behavioral models of trust formation. I highlight their failure to address trustworthiness expectations adequately. Early models restrict trust formation to rational choice. They focus on narrow self-interest and overlook the broader complexity of trustworthiness expectations. Behavioral models equate trust with cooperative behavior, neglecting the central role of trustworthiness expectations. To address these gaps, my paper introduces an epistemological account of trust formation that emphasizes competence, predictability, and responsiveness as key criteria for trustworthiness assessments. My account goes beyond economic or behavioral incentives for trust while acknowledging the psychological and contextual factors that could influence the formation of trustworthiness expectations. Trust is warranted when evidence about others' trustworthiness satisfies these criteria given the stakes and specific context of the trust situation.

This paper challenges previous models of trust formation and proposes a different outlook on trust and trust research. It builds on the assumption that human decision-making is even more sophisticated than current traditional and behavioral models of rational choice. It pleads for an acknowledgement on how people's beliefs guide choice. Decision-making models should integrate belief forming processes in explaining and predicting people's choices, as complex and imperfect as these processes may be. Theoretical and empirical accounts of trust should expand to include the multifaceted ways in which trust is shaped by individual history, psychological states, and cultural background. Methodologically, the account I propose calls for a mix of quantitative and qualitative methods to understand trust formation across different contexts and cultures. Case studies and interviews could substantiate quantitative research and offer an integrative narrative for the currently contradictory results produced by attitudinal measurements and behavioral studies on trust. From a practical point of view, the proposed criteria for trustworthiness serve as valuable tools for assessing and building trust in interpersonal relationships and organizations. They are particularly relevant for professionals such as managers and therapists, whose effectiveness heavily relies on establishing trust. This understanding could inform trust-building strategies tailored to specific contexts like business negotiations or team collaboration.

The primary limitation of my account is the lack of empirical research to support it. The three criteria are stated as logical conditions for trustworthiness assessments. While I use empirical research to support the build-up of my account, further empirical research is required to validate and refined the proposed framework. Future research should examine what cues people look at when assessing trustworthiness in others and how trustworthiness perceptions evolve over time and under varying circumstances. It should explore the cognitive processes behind trustworthiness assessments and their dependency on factors like culture and personal experiences.

References

1. Altman Klein, H., Miller, N.L., Militello, L.G., Lyons, J.B., & Finkeldey, J.G. (2019). Trust Across Culture and Context. *Journal of Cognitive Engineering and Decision Making, 13*(1), 10-29.

2. Andreoni, J. & Miller, J. (2002). Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica, 70*(2), 737-753.

3. Aspinwall, L.G., Richter, L. & Hoffman III, R.R. (2001). Understading how optimism works: An examination of optimists' adaptive moderation of belief and behavior. In E.C. Chang (Ed.), *Optimism & Pessimism: Implications for Theory, Research, and Practice* (pp. 217-238). American Psychological Association.

4. Banu, M. (2023). Whom do we trust? On how we assess others' trustoworthiness. *Annals of the University of Bucharest – Philosophy Series, 71*(1), 85-106.

5. Bauer, P.C., & Freitag, M. (2018). Measuring Trust. In E.M. Uslaner (Ed.), *The Oxford Handbook of Social and Political Trust* (pp. 15-36). Oxford University Press.

6. Baumgartner, T., Heinrichs, M., Vonlanthen, A., Fischbacher, U., & Fehr. E. (2008). Oxytocin Shapes the Neural Circuitry of Trust and Trust Adaptation in Humans. *Neuron, 58*, 639-650.

7. Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, Reciprocity, and Social History. *Games and Economic Behavior, 10*, 122-142.

8. Bohnet, I., Greig, F., Herrmann, B., & Zeckhauser, R. (2008). Betrayal Aversion: Evidence from Brazil, China, Oman, Switzerland, Turkey, and the United States. *American Economic Review, 98*(1), 294-310.

9. Bohnet, I., & Zeckhauser, R. (2004). Trust, risk and betrayal. *Journal of Economic Behavior & Organization, 55*, 467-484.

10. Bolton, G.E., & Ockenfels, A. (2000). ERC: A theory of Equity, Reciprocity, and Cooperation. *The American Economic Review, 90*(1), 166-193.

11. Carver, C.S., & Scheier, M.F. (2018). Generalized Optimism. In G. Oettingen, A.T. Sevincer, & P.M. Gollwitzer (Eds.), *The Psychology of Thinking About the Future* (pp. 214-230). New York, London: The Guilford Press.

12. Castelfranchi, C., & Falcone, R. (2000). Trust is Much More Than Subjective Probability; Mental Components and Sources of Trust. *Proceedings of the 33rd Hawaii International Conference on system sciences* (pp.1-10).

13. Charness, G., & Rabin, M. (2002). Understanding Social Preferences with Simple Tests. *The Quarterly Journal of Economics, 117*(3), 817-869.

14. Chatterjee, C., Johnson, C.K., Sams, A.B.E. (2019). "Equal or Nothing": Concern for Fairness and Reciprocity in Trust Game. *International Journal of Economic Behavior*, 9, 3-11.

15. Churchland, P.S. (2011). *Braintrust: What Neuroscience Tells Us about Morality.* Princeton, Oxford: Princeton University Press.

16. Coleman, J.S. (1990). *Foundations of Social Theory.* Cambridge (MA), London: The Belknap Press of Harvard University Press.

17. De Dreu, C.K.W., Greer, L.L., Handgraaf, M.J.J., Shalvi, S., Van Kleef, G.A., Baas, M., Ten Velden, F.S., Van Dijk, E., & Feith, S.W.W. (2010). The Neuropeptide Oxytocin Regulates Parochial Altruism in Intergroup Conflict Among Humans. *Science, 328*, 1408-1411.

18. Domes, G., Heinrichs, M., Michel, A., Berger, C., & Herpertz, S.C. (2007a). Oxytocin Improves "Mind-Reading" in Humans. *Biological Psychiatry, 61*: 731-733.

19. Domes, G., Heinrichs, M., Gläscher, J., Büchel, C., Braus, D.F., & Herpertz, S.C. (2007b). Oxytocin Attenuates Amygdala Responses to Emotional Faces Regardless of Valence. *Biological Psychiatry, 62*, 1187-1190.

20. Dunn, J.R., & Schweitzer, M.E. (2005). Feeling and Believing: The Influence of Emotion on Trust. *Journal of Personality and Social Psychology, 88*(5), 736-748.

21. Dunning, D., Fetchenhaur, D., & Schlösser, T.M. (2012). Trust as a social and emotional act: Noneconomic considerations in trust behavior. *Journal of Economic Psychology, 33*(3), 686-694.

22. Dunning, D., Anderson, J.E., Schlösser, T., Ehlebracht, D., & Fetchenhauer, D. (2014). Trust at Zero Acquaintance: More a Matter of Respect Than Expectation of Reward. *Journal of Personality and Social Psychology, 107*(1), 122-141.

23. Engelmann, J.B., & Fehr, E. (2017). The Neurobiology of Trust and Social Decision-Making: The Important Role of Emotions. In P.A.M. Van Lange, B. Rockenbach, & T. Yamagishi (Eds.) *Trust in Social Dilemmas* (pp. 33-56). Oxford: Oxford University Press.

24. Evans, A.M. & Krueger, J.I. (2016). Bounded Prospection in Dilemmas of Trust and Reciprocity. *Review of General Psychology, 20*(1), 17-28.

25. Fehr, E. (2009). On the Economics and Biology of Trust. *Journal of the European Economic Association, 7*(2-3), 235-266.

26. Fehr, E. & Schimdt, K.M. (1999). A Theory of Fairness, Competition, and Cooperation. *The Quarterly Journal of Economics, 114*(3), 817-868.

27. Fehr, E., Fischbacher, U., & Kosfeld, M. (2005). Neuroeconomic Foundations of Trust and Social Preferences. *IZA Discussion Papers, No. 1641* (pp. 1-13). Institute for the Study of Labor (IZA).

28. Fetchenhauer, D., Dunning, D., & Schlösser, T. (2017). The Mysteries of Trust: Trusting Too Little and Too Much at the Same Time. In P.A.M. Van Lange, B. Rockenbachm & T. Yamagishi (Eds.), *Trust in Social Dilemmas* (pp. 139-154). Oxford University Press.

29. Gambetta, D. (1988). Can We Trust Trust? In D. Gambetta (Ed.), *Trust: Making and Breaking Cooperative Relations* (pp. 213-37). Basil Blackwell.

30. Guastella, A.J., Mitchell, P.B., & Mathews, F. (2008). Oxytocin enhances the encoding of positive social memories in humans. *Biological Psychiatry, 64*(3), 256-258.

31. Guastella, A.J., Einfeld, S.L., Gray, K.M., Rinehart, N.J., Tonge, B.J., Lambert, T.J., & Hickie, I.B. (2010). Intranasal Oxytocin Improves Emotion Recognition for Youth with Autism Spectrum Disorders. *Biological Psychiatry, 67*, 692-694.

32. Hardin, R. (2002). *Trust and Trusworthiness*. New York: Russell Sage Foundation.

33. Hinton, P.R. (2016). *The Perception of People: Integrating cognition and culture*. London, New York: Routledge.

34. Jones, K. (1996). Trust as an Affective Attitude. *Ethics, 107*(1), 4-25.

35. Kahneman, D. & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica, 47*(2), 263-291.

36. Kahneman, D. (2011). *Thinking, Fast and Slow*. New York: Farrar, Strauss and Giroux.

37. Kirsch, P., Esslinger, C., Chen, Q., Mier, D., Lis, S., Siddhanti, S., Gruppe, H., Mattay, V.S., Gallhofer, B., & Meyer-Lindenberg, A. (2005). Oxytocin Modulates Neural Circuitry for Social Cognition and Fear in Humans. *The Journal of Neuroscience, 25*(49), 11489-11493.

38. Knack, S. & Keefer, Ph. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics, 112*(4), 1251-1288.

39. Koford, K. (1998). Trust and reciprocity in Bulgaria: A replication of Berg, Dickhaut and McCabe (1995). Working paper 98-08, *University of Delaware Department of Economics*.

40. Kosfeld, M., Heinrichs, M., Zak, P.J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. *Nature,* 435, 673-676.

41. Krueger, J.I., Massey, A.L., & DiDonato, T.E. (2008). A Matter of Trust: From Social Preferences to the Strategic Adherence to Social Norms. *Negotiation and Conflict Management Research, 1*(1), 31-52.

42. Krueger, J.I., Evans, A.M., & Heck, P.R. (2017). Let Me Help You Help Me. In P.A.M. Van Lange, B. Rockenbach, & T. Yamagishi (Eds.), *Trust in Social Dilemmas* (pp. 121-138). Oxford University Press.

43. McCabe, K.A., Rigdon, M.L., & Smith, V.L. (2003). Positive reciprocity and intentions in trust games. *Journal of Economic Behavior & Organization,* 52, 267-275.

44. McLeod, C. (2022). Trust. *Stanford Encyclopedia of Philosophy.* Retrieved from https://plato.stanford.edu/archives/fall2021/entries/trust/.

45. Mikolajczak, M., Gross, J.J., Lane, A., Corneille, O., de Timary, P., & Luminet, O. (2010). Oxytocin Makes People Trusting, Not Gullible. *Psychological Science, 21*(8), 1072-1074.

46. Ortmann, A., Fitzgerald, J., & Boeing, C. (2000). Trust, reciprocity, and social history: A re-examination. *Experimental Economics,* 3, 81-100.

47. Putnam, R. D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy.* Princeton University Press.

48. Rabin, M. (1993). Incorporating Fairness into Game Theory and Economics. *The American Economic Review, 83*(5), 1281-1302.

49. Rompf, S.A. (2015). *Trust and Rationality: An Integrative Framework for Trust Research.* Springer VS.

50. Ross, L. (1977). The intuitive psychologist and his shortcomings: distortions in the attribution process. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 173-220). New York: Academic Press.

51. Rousseau, J.-J. (1993 [1755]). *Discourse on the Origins of Inequality (Second Discourse). Polemics, and Political Economy*. Hanover, London: University Press of New England.

52. Simon, H.A. (1997). *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations* (4th ed.). New York, London, Toronto, Sydney, Singapore: The Free Press.

53. Schwartz, N., & Clore, G.L. (1988). How do I feel about it? The informative function of affective states. In K. Fiedler & J. Forgas (Eds.), *Affect, cognition and social behavior* (pp. 44-62). Lewinston, NY: Hogrefe.

54. Skuse, D., & Gallagher, L. (2009). Dopaminergic-Neuropeptide Interactions in the Social Brain. *Trends in Cognitive Science 13*(1), 27-35.

55. Thielmann, I., & Hilbig, B.E. (2015). Trust: An Integrative Review From a Person–Situation Perspective. *Review of General Psychology, 19*(3), 249-277.

56. Todorov, A., Mandisodza, A.N., Goren, A., & Hall, C.C. (2005). Inferences of Competence from Faces Predict Election Outcomes. *Science, 308*(5728), 1623-1626.

57. Todorov, A., Baron, S.G., & Oosterhof, N.N. (2008). Evaluating face trustworthiness: a model based approach. *Social Cognitive and Affective Neuroscience,* 3, 119-127.

58. Uddenburg, S., Thompson, B., Vlasceanu, M., Griffiths, T.L., & Todorov, A. (2020). A face you can trust: Iterated learning reveals how stereotypes of facial trustworthiness may propagate in the absence of evidence. *Journal of Vision, 20*(11), 1735.

59. Van IJzendoorn, M.H., & Bakermans-Kranenburg, M.J. (2012). A sniff of trust: Meta-analysis of the effects of intranasal oxytocin administration on face recognition, trust to in-group, and trust to out-group. *Psychoneuroendocrinology,* 37, 438-443.

60. Warren, M.E. (2018). Trust and Democracy. In E.M. Uslaner (Ed.), *The Oxford Handbook of Social and Political Trust* (pp. 75-94). Oxford: Oxford University Press.
61. Williams, B. (1988). Formal Structures and Social Reality. In D. Gambetta (Ed.), *Trust: Making and Breaking Cooperative Relations* (pp. 3-13). Basil Blackwell.
62. Willinger, M., Lohmann, C., & Usunier, J.-C. (1999). Comparison of trust and reciprocity between France and Germany: Experimental investigation based on the investment game. *University Louis Pasteur*.
63. Wilson, J.P. (2007). The lens of culture: theoretical and conceptual perspectives in the assessment of psychological trauma and PTSD. In J.P. Wilson & C.S. Tang, *Cross-cultural assessment of psychological trauma and PTSD* (pp. 3-30). N.Y.: Springer.
64. Yamagishi, T. (1998). *The Structure of Trust: An Evolutionary Game of Mind and Society.* Tokyo: Tokyo University Press.
65. Yamagishi, T., Akutsu, S., Cho, K., Inoue, Y., Li, Y., & Matsumoto, Y. (2015). Two-Component Model of General Trust: Predicting Behavioral Trust from Attitudinal Trust. *Social Cognition, 33*(5), 436-458.
66. Zak, P.J., & Knack, S. (2001). Trust and Growth. *The Economic Journal,* 111, 295-321.
67. Zhong, S., Monakhov, M., Mok, H.P., Tong, T., Lai, P.S., Chew, S.H., & Ebstein, R.P. (2012). U-Shaped Relation between Plasma Oxytocin Levels and Behavior in the Trust Game. *PLoS ONE, 7*(12), e51095.

WHAT IMPACT DO SOCIAL NETWORKS HAVE ON DEMOCRACY IN SUB-SAHARAN AFRICA? AN ANALYSIS THROUGH THE PRISM OF DOWNS (1957) ECONOMIC THEORY

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Abstract

This study examines the effect of social networks on democracy in Sub-Saharan Africa. Although the subject is not new in the literature, the study has the particularity of taking into account the effect of information asymmetries in determining the utility that citizens hope to derive from democracy. From analyses conducted using the instrumental variables method, it appears that the effect of social networks on democracy is differential depending on whether one is in a situation of information asymmetry or not. In a situation of information symmetry, the rationality of the citizen is optimal, he makes good decisions in electoral matters and social networks contribute to improve the usefulness he derives from democracy by 20%. On the other hand, in a situation of information asymmetry, it is deceived by the political system and its decisions tend to reduce its usefulness by 7 points. Results, although attached to some limits, challenge governments in the direction of promoting transparency of information for a good democracy.

1. Introduction

Based on events such as the Arab Spring that affected many North African countries in the early 2011's and the yellow vest movement in 2019, in France, the role of social networks on democracy remains controversial in the literature. At this level two main currents are

opposed: that of skeptics and that of supporters of social networks in the promotion of democracy.

For skeptics, social media is more of a threat than an opportunity to promote democracy. Couturier (2022) argues that democracy is sick of social networks. Previously celebrated for its capacity for democratic vitalization, social networks are today strongly criticized. By helping to polarize opinions, they facilitate manipulation and exacerbate social tensions. The problem of the truthfulness of the information relayed constantly arises, notes the author. Palano (2019) and Mounk (2018) also point out that with the advent of social media, the standard methods of traditional media have been questioned. Information is no longer only reported by specialists in the field, but anyone who witnesses an event can decide to relay it as it happened, or to launch a rumor, or to report the facts according to his own opinion. This approach, with the disadvantage of increasing the risk of information manipulation and thus contributing to the deconsolidation of democracy. For Sunstein (2018), social networks, while useful for solving other types of social problems (such as vulnerability, depression following the loss of a job or the loss of a loved one, etc.), have a detrimental effect on democracy. The author talks about the proliferation of information «cocoons» and the risk of circulation of fake news. Focusing on the American electoral context, he points out that social media users are usually led to believe a lot of things that are false and thus fail to learn a lot of things that are true. And that's terrible for democracy. Especially since those who have specific interests (including politicians or some nations like Russia) can use social networks to disrupt (through false information) or promote their interests (Acemoglu *et al.*, 2021).

For Downs (1957), who analyses democracy as a commodity traded on a market (the political market), social networks have a positive effect on democracy. The author explains his argument by the fact that citizens who are consumers of democracy are rational and use social networks to improve their level of information on the programs of politicians and political parties that are providers of democracy. Once informed about a number of elements, citizens will react at the time of the vote in the direction of improving their level of utility. This is the same opinion shared by Najar (2013), who notes that in the Middle East, Eastern Europe, and Latin America, Citizens have exploited social networks to overthrow regimes where the dynamics of democracy had become ineffective in meeting the needs and aspirations of its populations. Godin (2010), who agrees, notes that the arrival of social networks has contributed to the emergence of new democratic practices. The latter go beyond state governance (government and political party), since they now invest the different places of social participation: association of all kinds, discussion groups, forum of exchanges, personal or professional blogs, etc. Thanks to social networks, citizens can constantly debate in groups, get information, and collect all the information that can facilitate their choice at the time of voting.

Sub-Saharan Africa, the area covered by this study, reports that more than 40 countries have adopted democracy as a model of political development (Gueye, 2009; Harding and Stasavage, 2014; Van Hoek and Bossuyt, 1993; Mbondo *et al.*, 2023). However, the extension of the democratic process suffers from some resistance that has often resulted in political takeovers by the military juntas (in Burkina Faso, Chad, Guinea, Sudan, Mali, Gabon). Takeovers are often facilitated or dubbed from social networks by populations (according to Statcounter statistics (2017)) the 03 most used networks in Africa are Facebook (168 million users), Instagram (31 million) and Linkedin (24 million)). Anything that, despite the multiple questions of researchers in other geographical areas such as Latin

America or the United States (Goirand, 2010; Wormser, 2017), continues to provoke controversy. The effect of social networks on democracy in sub-Saharan Africa remains ambiguous.

Taking into account these theoretical and contextual elements, the main question of this study is:

> *Are social networks an opportunity or a threat to democracy in Sub-Saharan Africa?*

The objective of this study is to examine the impact of social networks on democracy in Sub-Saharan Africa. Specifically, it will: i) examine the significance of the effect of social networks on democracy and ii) decide on the meaning of this effect. The study aims to shed light on the controversy surrounding the effect of social networks on democracy.

In order to achieve the above objectives, we formulate the following hypotheses regarding the above literature: Because individuals are rational and use strategies to maximize their usefulness in the political market, i) "social networks have a significant effect on democracy"; and (ii) "this effect is positive" (Downs, 1957; Najar 2013; Enke and Graeber, 2023).

The above hypotheses will be examined using the instrumental variable method depending on whether the individual is in complete or limited information. The rest of the study will be organized as follows: Section 2 presents the literature review; Section 3 is devoted to the methodology; Section 4 the results of the study; Section 5 to the discussions and Section 6 concludes the study.

2. Interaction between social networks and democracy

2.1 From a theoretical perspective

For Downs (1957) democracy is like a commodity that is traded on a market (the political market). In this market, citizens are consumers of democracy, while politicians and political parties are producers, suppliers of democracy. All players in this market are rational. While politicians and political parties seek to maximize their political support, citizens seek to maximize its usefulness from government activity. In his work, the author links the concept of democratic government to the role of political parties and the interests of voters. It shows that the voters, who have access to a certain level of information via for example social networks apprehend the actions of the government and use their rationality to the best of their ability to support the candidate or political party that will be able to sustain their aspiration. This interdependent circular relationship between the government that plans actions and the voters who decide on the vote underlies the proper functioning of democracy (Mitropolistski, 2014). Finally, Downs notes that the occurrence of uncertainties affects political decision-making. A view shared by Enke and Graeber (2023).

2.2 From a practical perspective

McKinnon (2012), which focused a lot on the Chinese context, shows that because of uncertainties about each other's attitudes, and the risk of manipulation of information relayed on social networks such as Facebook and others, governments are increasingly using censorship. What is ultimately to oppress the freedoms of individuals. The author

also criticizes the anti-anonymity policy of web giants such as Google and Facebook, which instead of protecting users, through the confidentiality of their data, make the latter more accessible to governments, who can thus control activists and, where appropriate, restrict freedoms (Crouzet *et al.*, 2023).

Boukary (2014) points out that in Mali, the social network Facebook was used during the 2012 Malian crisis in the direction of promoting democracy. The author who was interested in a dozen groups on the social network Facebook, notes that the members of the latter were informed in real time about the situation of their country and could therefore, freely supported the various political actors they felt were able to protect the gains of democracy. The author also notes that this social network (Facebook) would have played a similar role in the context of the Arab Spring and the Ivorian crisis. Blilid and Favier (2018) who agree, argue that in the specific case of Amazigh, a community of North Africa, the social network Facebook, through, among others, the platform «Amazigh visualization» contributed to the promotion of democracy in this locality in the dynamics of the events of claims that triggered in this part of Africa in 2011. For the authors Facebook has facilitated the genesis of a new form of cultural activism, itself carried by the constitution «dreamed identity» after debates between the members of this community.

Kahi (2018), who focused on the Ivorian context, stresses that in this country social networks have also had an influence on democracy. This influence tends to favor politics more than citizens. The author points out for example in the various uprisings that the country has experienced in recent years (whether on the political or social level (strikes of the employees, demand of all kinds)), social networks have often been used by political actors to influence youth in the desired direction. To achieve these results, the author conducted a documentary data collection/ interview with a population of young people aged 30 to 35. The author mentions that 14 blogs linked to Facebook and Twitter were mobilized in this direction.

Moroianu (2023) stresses that social media platforms have an influence on democracy, through among other things the spread of messages of hatred, tribalism, and disinformation. People who are marginalized, misinformed and without access to relevant sources of information are struggling to make the most of democracy. These people also have a hard time defending their fundamental rights, says the author. Priambodo (2023) notes that with the advent of social networks, the political world is forced to readjust, because many debates are generally held on these platforms. The author points out that some voters prefer to obtain information on these platforms rather than using conventional means of communication (television, radio, etc.). This is all the more so since the data sought are more quickly accessible. Qodir (2023), which agrees with the same point, emphasizes however in the Indonesian context the low coverage of the Internet which does not always allow all voters to have access to all the facilities that social networks could offer, and so are often content with information gathered from traditional sources to make their decision at the time of voting.

Ali *et al.* (2024) point out that in Pakistan, social networks have had the effect of increasing (by about 48%) the participation rate of young people aged 18 to 29 in the 2024 elections. The authors also point out that this participation of young people went beyond voting and was also reflected in their involvement in speeches and political campaigns. Puka and Beshiri (2013), explain this phenomenon by a modification of the political education models that prevailed until then. Pradipta *et al.* (2023) point out that social networks have helped to further polarize the political landscape through a fragmentation of

support groups for individual candidates. Musso (2023), speaks of the intersection between artificial intelligence and decision-making processes that would have emerged as a transformative force on both economic and political spheres.

3. Methodology

3.1 Model Specification

The theoretical model of this study is inspired simultaneously by the work of Acemoglu *et al.*, 2021 on democracy and the work of Von Neumman and Morgenstern (1944) on the expected utility functions, and presents the citizen's reaction function as a function of utility stemming from the satisfaction it derives from democracy.

$$FR\ (citizen) = U\ (Democracy)$$

However, the utility that the citizen derives from depends itself on the vector of the means at his disposal to appreciate the effects of democracy.

$$FR\ (citoyen) = U(démocratie) = \sum_{i=1}^{n}(\alpha_i mi)\ ,$$

With U (democracy) is the expected level of usefulness of democracy. And αi the sensitivity with which the medium mi is chosen to improve the level of utility U.

Given that democracy can be seen as a representative, pluralistic and competitive system (Marchesin, 2004), these means can be: the use of social networks; freedom of expression; freedom to participate in political discussions; freedom of press; existence or not of external influence ("manipulability").

By replacing the mi with their expressions, we have:

$$U(democratie) = \alpha_1 UsageRS_i + \alpha_2 Expressfreedom_i + \alpha_3 politicdiscussion_i +$$
$$\alpha_4 mediasfreedom_i + \alpha_5 manipulabilité +\ u_i,\ (I)$$

At this level, starting from the work of Downs (1957) and Enke and Graeber (2023), we distinguish two cases:

a. Information is symmetrical between politicians and the citizen (lack of "manipulability" / certain environment).
   Equation (I) becomes:

$$U(democratie) = \alpha_1 UsageRS_i + \alpha_2 Expressfreedom_i +$$
$$\alpha_3 politicdiscussion_i + \alpha_4 mediasfreedom_i + u_i\ ,$$

b. Information is asymmetrical between politicians and the citizen (presence of "manipulability" / uncertain environment).

But as Acemoglu *et al.*, 2021, the «manipulability» G from the government or political parties depends on the level of exposure of the citizen, in this case in our case, the level of exposure on social networks that we note E and the sensitivity of the citizen to external influences that we note β. We then have:

$$G = \beta\ Ln\ (E)$$

With E = average number of days of connection per month; Ln = logarithm neperian.

By replacing G by its value in (I), we finally obtain:

$$U(democratie)=\alpha_1 UsageRS_i + \alpha_2 Express freedom_i + \alpha_3 politic discussion_i + \alpha_4 medias freedom_i + \alpha_5 * \beta * Ln(E) + u_i$$

Where:
UsageRS = the citizen's use of social networks;
Expressfreedom = freedom of expression;
Politicdiscussion = participation in political discussions;
Mediasfreedom = the freedoms of the press.

Without limiting generality, in this study, we will arbitrarily choose β=2.

3.2 Estimation Methods

Taking into account that in the literature it is mentioned that social networks can have an effect on democracy and vice versa, it would be wise to resort to an instrumental variable model, which allows to control the endogeneity biases often encountered in this model type with simultaneous equations. However, in this study, without limiting generality, we have a model with incomplete information, because only one of the equations. Then the double least squares method, which is one of the instrumental variable methods, will be used in this framework to estimate the effect of social networks on democracy.

3.3 Verify that there is indeed an endogeneity bias in the study model

The Hausman test makes it possible to check whether there is indeed a difference between the estimator of the instrumental variables and the estimator of the Ordinary Least Squares (OLS). The conclusions of this post-estimation test are given by the values of the Durbin-Wu-Hausman (DWH) statistic at the 5% threshold for the following hypotheses:

H0: No difference between the two estimators (exogeneity)

H1: Significant difference (endogeneity)

If the DWH statistic is not significant at the 5% threshold, H0 is retained, otherwise the alternative hypothesis (H1) is retained.

Table 1 − Haussman Test

Variables	coefficients	Std.err	Z	P>IZI	[95% conf. interval]
UsageRS	0.19	0.03	6.24	0.000	0.12-0.24
Constante	1.1	0.04	30.41	0.000	1.03-1.18
Durbin Wu-Haussman statistic			DWH=36,4511***		

Number of observations 45823 ; Wald chi2(1)=39.92***
Note : *** significant threshold1%
Source: authors from the study data

Table 1 shows that the value of the Durbin-Wu-Hausman (DWH) statistic is 36.4511. It is significant at the 1% threshold. This leads us to reject the H0 hypothesis. So, there is indeed endogeneity in the model. The instrumental variable method is therefore more appropriate than the OLS method for estimating model variables.

Table 2 − Comparison of the results of the multiple linear regression model (without taking into account endogeneity questions) with those of the instrumental variable model taking into account these endogenous effects.

Variables	Initial Model	Revised model
Social Network	0.015*** (0.05)	0.2***(0.003)
Politicdiscussion	-0.02*** (0.05)	-0.04***(0.006)
Expressfreedom	0.04***(0.004)	0.04***(0.004)
mediasfreedom	0.14***(0.004)	0.016***(0.004)
observations	45823	45823
Number of instruments	/	04
Wald chi2	27.79***	146,85***
Number of countries	29	29

*** significant threshold1%
Parenthèses denote standard deviation
ns: not signicant
Source: authors from Afrobarometer data (2018)

3.4 Data source and lists of variables

3.4.1 Data Source

The data in this study come from Afrobarometer's Round 7 survey conducted in 2018 in 34 African countries. Afrobarometer is a comparative series of surveys on issues of democracy and local governance. These surveys are conducted at regular intervals in several African countries, including sub-Saharan African countries. Starting in 1999, Afrobarometer was only interested in 12 countries, but since Round 6, it covers more than thirty countries. Afrobarometer is a collaborative initiative of the Institute for Justice and Reconciliiation (IJR) in South Africa, the Center for Democratic Development (CDD-Ghana), the Institute for Development Studies (IDS) at the University of Nairobi in Kenya and the Institute for Empirical Research in Political Economy (IREEP) in Benin. The network also has technical support from Michigan State University (MLSU) and University of Cape Town (UCT).

Afrobarometer collects and disseminates information on African views on democracy, governance, economic reforms, civil society, and living standards. Regarding the methodology, Afrobarometer obtains the information collected from individual respondents through personal interviews. The same questionnaire with identical or functionally equivalent points is administered to each respondent in each country. Since the questions are standardized, the answers can be compared from one country to another and from one period to another. It should also be noted that Afrobarometer surveys are based on national random samples. Therefore, the aggregate results are representative of larger groups. Nationally, sampling sizes range from 1200 to 2400 individuals. Samples of 1200 and 2400 all large enough to draw conclusions about all citizens of voting age with a large average error due to sampling of plus or minus 2.8 percent at the 95 percent confidence level.

3.4.2   List of variables
Dependent variable
The dependent variable of this study is the usefulness that the citizen derives from democracy. In this study we will use the variable Q36 of the Afrobarometer database that captures the level of satisfaction that the citizen (the head of household) gets from democracy. For practical purposes, this variable has been renamed to democracyhappy.

Independent variables
The table below lists the variables independent of the study. They are all available in the Afrbaoreter database; their choice for this study is inspired by the work of Enke and Graeber (2023), Acemoglu *et al.*, 2021; Todd (2008) and Bedock (2014).

Table 3 − List of independent variables

Variables	Definitions	Source
Usage RS	Use of social networks	Available in Afrobarometer data (2018)
Politicdiscussion	Participation in political discussion	Available in Afrobarometer data (2018)
Expressfreedom	Expression of freedoms	Available in Afrobarometer data (2018)
Mediasfreedom	Press freedoms	Available in Afrobarometer data (2018)
G	Manipulation/influence of politics on citizens	Authors, from the variable Q12E of the database providing information on the frequency of use of social networks
AgeCM	Age of citizen	Available in Afrobarometer data (2018)

Source: authors

Choice of instruments
The instruments below have been chosen for their relationship to the independent variables of the study. Indeed, Krzatala (2013) stresses that the use of social networks depends on the age of Internet users. Gaxie (2007) notes that the level of education of the citizen is an element of power in political discussion. Turcotte (2001) notes that the level of expression of freedoms varies according to the environment and region of residence. Vidjinnagui

(2003) emphasizes that the living conditions of citizens can influence the level of press freedom.

Table 4 − List of independent variables and their instruments

Variables	Instruments	Source
Social Network	Age of citizens	Available in base Afrobarometer (2018)
Politicdiscussion	Citizen's instruction	Available in base Afrobarometer (2018)
Expressfreedom	home region	Available in base Afrobarometer (2018)
Mediasfreedom	living conditions	Available in base Afrobarometer (2018))

Source: authors

4. Results

4.1 Descriptive Statistics

Table 5 shows that we have a level of satisfaction with democracy that varies between 1 and 2, with an average of 1.34. At the same time the use of social networks varies between 1 and 2 with an average of 1.2.

Table 5: Descriptive statistics of key variables

Variables	Observations	Moyenne	Ecart type	Minimum	Maximum
Democracyhappy	45823	1,34	0,47	1	2
UsageRS	45823	1,2	0,4	1	2

Source: authors from Afrobarometer data (2018)

4.2 Model Estimation

Table 6 shows that social networks have a significant effect on the usefulness that citizens derive from democracy.

Table 6 − Results of estimates of the effect of social networks on democracy in symmetric and asymmetric information situations respectively

Variables	Model 1 (Information symmetry between politics and citizens)	Model 2 (Asymmetric information)
UsageRS	0,2***(0,03)	-7,02***(2,18)
Politicdiscussion	0,04***(0,006)	0,05***(0,002)
Expressfreedom	0,04***(0,006)	0,01ns (0,001)
mediasfreedom	0,01***(0,004)	0,007ns (0,0009)
G	/	-2,30*** (0,7)
Observations	45823	
Number of countries	29	29
Number of instruments	04	04
Wald Chi2	146***	38,46***

*** significant threshold 1%; parenthèses denote standard deviation; ns: not signicant;
Source: authors from Afrobarometer data (2018)

In a situation of symmetrical information between the political and the citizen, it appears that the increase of one point in the use of social networks by the citizen translates into a 20% improvement in the level of satisfaction that he gets from democracy.

On the other hand, in a situation of asymmetry of information between the political and the citizen, it appears that the increase by the citizen of one point of his level of use of social networks translates into a reduction of the level of satisfaction that he gets from democracy by 7 points.

5. Discussion

The above analyses show that social networks have a differential effect on democracy in sub-Saharan Africa depending on whether one is in a situation of information asymmetry between the citizen and the political or not. In the absence of asymmetry of information, between these two actors, the reaction of the citizen is optimal, insofar as he uses to the maximum of his economic rationality to improve the utility he derives from democracy. On the other hand, when the environment becomes uncertain and characterized by a proven risk of manipulation from politics, the asymmetry of information between the actors, leads the citizen to make mistakes and make very bad choices at the time of the vote. These choices will in fact be very detrimental to the level of utility it derives from democracy.

In doing so, we can, in light of these analyses, accept the hypothesis that "because individuals are rational and use strategies to maximize their usefulness in the political market, social networks have a significant effect on democracy." And to reject that which considers that «this effect is positive». These nuanced results are in opposition to extreme authors who believe social networks have either a positive effect on democracy or a negative effect. The two positive and negative effects are actually envisaged, it all depends on the risk of versatility of the political environment. The higher this risk, the more if «gambling» without repetition, citizens will tend to make bad decisions. However, if the game is repeated, in virtue of the principle of adaptive anticipations (Coutelet and Weil-Dubuc 2016), the citizen will tend to improve his performance. A position that is consistent with the predictions of Dows (1957) as well as those of Enke and Graeber (2023).

Indeed, for Downs (1957), the existence of asymmetries of information between voter and candidate is likely to create cognitive biases among voters, which in a decision-making process aimed at maximizing the usefulness that it drew from democracy, tend to make mistakes. These errors can be valued in monetary terms or in terms of opportunity cost. Enker and Graeber (2023) highlight the economic relevance of measuring cognitive uncertainty, including citizens' subjective uncertainty about their ex ante decision to maximize utility. In a series of experiments on risk choice, belief formation, and economic predictors, the authors have shown that systematic bias in economic decision-making exists. The asymmetries of information between voters and politicians thus weaken the decision-making capacities of voters, generating erroneous beliefs, and biased forecasts in their hope of utility.

6. Conclusion

This study showed that all other things equal social networks have a differential effect on democracy depending on whether one is in information asymmetry or not. In a situation of information symmetry between citizens and politicians, citizens tend to make good use of

social networks because of their economic rationality. On the other hand, when information becomes asymmetrical between him and the politician, he tends to make mistakes when making decisions. The decisions had a very negative effect on its level of utility. Concretely, in a situation of information asymmetry, the study showed that the increase of one point in the use of social networks reduces the usefulness of democracy by 7 point. Nuanced results that are however in line with the work of Dows (1957) as well as those of Enke and Graeber (2023). However, as recommendations we encourage policymakers to focus more on transparency of information for the sustainable improvement of democracy. Because the transparency of information makes it possible is an essential pillar of sustainability, because it makes it possible to create a kind of viable contract between the different actors involved.

A contract that thus allows to escape the bias that would be caused by the moral hazard of the actor able to manipulate information (Zakaria *et al.* 2021). Information transparency should also reduce not only the negative effects of social polarization, but also the risks of radicalization and recourse to fundamentalist systems of thought (Serfaty, 2022; Pradipta *et al.* 2023). Moreover, it is noted that the use of traversable data is positioned as a limit for this study which would probably lead to more nuanced results if the work had been done on cohorts. It would then be possible to observe a kind of adaptive anticipation mechanism on the part of voters, in order to reduce their cognitive biases

References

1. Acemoglu, D., Ajzenman, N., Aksoy, C.G., Fiszbein, M., Molina, C.A., (2021), *Democracies breed in their owns support*. Working Paper 29167. National Bureau of Economic Research.
2. Ali, S.M., Sarwar, M., Ghani, M.U. (2024), Assessing the Progress of Youth Political Partipation and its Impact on Democracy: a case study of 2024 Elections of Pakistan. Pakistan Social Sciences Review, 8(2).
3. Bedock, C. (2014), Les déterminants politiques de la fréquence des réformes démocratiques: Europe de l'Ouest, 1990-2010. *Revue française de science politique*, 64, 929-954.
4. Blilid, A., Favier L. (2018), Les effets du réseau social Facebook sur le combat identitaire amazigh. *Le monde réel numérique*. 35(2).
5. Boukary, S. (2014), *Réseaux sociaux et communications en temps de crises au Mali: l'exemple des groupe de discussions*. CEI-CLN.
6. Coutellec L., Weil-Dubuc P.L. (2016), Les figures de l'anticipation: ou comment prendre soin du futur. *Revue française d'éthique appliquée*. 2(2), 14-18.
7. Couturier, B. (2022), *La démocratie malade des réseaux sociaux*. Cnstructif, 61, 37-40.
8. Crouzet N., Gupta A., Mezzanotti F., (2023), Shocks and technology adoption: evidence from electronic payment systems. Journal of Political Economy, 131(11), 3003-3035.
9. Downs, A. (1957), *An Economic Theory of Democracy*. Haper and Brother Publishers, New York.
10. Enke, B., Graeber, T. (2023), cognitive uncertainty. *The quartely Journal of Economics,* 138(4), 2021-2067.

11. Fomba, K.B., Kokam, D., Nchofoung T. (2021), *Social media and political instability: some empirical evidence*. www.accessecon.com.
12. Godin, R. (2010), *Réseaux sociaux et nouveaux espaces démocratiques*. Encyclopédie du patrimoine culturel des Amériques.
13. Goirand, C. (2010), Penser les mouvements sociaux d'Amérique latine: les approches des mobilisations depuis les années 1970. *Revue française de science politique*. 60, 445-466.
14. Gueye, B. (2009), La démocratie en Afrique: succès et résistances. Pouvoirs, 129, 5-26.
15. Harding, R. Stasavage, D. (2014), What democracy does (and doesn't) for basic services: schools fees, schools inputs and African elections. *Journal of Polititics*, 76(1), 229-245.
16. Kahi, H. (2018), Participation politique en ligne et transformation des pratiques journalistiques en Afrique subsaharienne à l'ère des espaces socio-numériques. *Le monde réel numérique*, 35(2).
17. Mackinnon, R. (2012), *Consent of the networked: the worldwide struggle for internet freedom*. New York, Basic Books.
18. Marchesin, P. (2004), Démocratie et développement. *Revue Tiers monde*, 179, 487-513.
19. Mitropolistski, S. (2014), *Une théorie économique de la démocratie, d'Anthony Downs*. Volume 33, n. 1, Bruxelles, Editions de l'université de Bruxelles.
20. Moroianu, A. (2023), *Social media platforms and challenges for democracy, rule of law and fundamental right. Drepturile Omului-Hein online*.
21. Mounk, Y. (2018), Le peuple contre la démocratie. *L'observatoire*.
22. Musso, F. (2023), Decision Making and Artificial Intelligence: New Frontiers for Entrepreurship and Management. *International Journal of Economic Behavior*, 13(1).
23. Najar, S. (2013), *Les réseaux sociaux sur Internet à l'heure des transitions démocratiques*. Paris, Khartala, coll. Hommes et Sociétés.
24. Palano, D. (2019), La fin du «public», la bubble democracy et la nouvelle polarisation, in Delsol, C., De Ligio, G. (ed.), *La démocratie dans l'adversité. Enquête internationale*, Cerf, Paris, pp. 2019: 699-715.
25. Paul, M., Leppelly, D., Smaoui H. (2013), Introduction à la théorie des jeux: les jeux non coopératifs. *Ecoflash*, revue du CNDP.
26. Pradipta, E.P., Rahman, T., Sukmono, F.G. (2023), *Analysis of Political Polarization Discourse on Social Media Ahead of the 2024 Election*. Conference Paper. HCI International Posters. Springer.
27. Priambodo, B. (2023), Political Marketing Towards the 2024 Local Elections in the Frame of Digital Democracy. *Social and Political Reviews*, 4(1).
28. Puka, E. Beshiri D. (2013), Political and Economic Aspect in Education: An Analysis of Citizen Formation Process Through Active Citizenship. *International Journal of Economic Behavior*, 3(1).
29. Qodir, Z. (2023), *Artificial Intelligent, Digital Democracy and Islamic Party in Indonesian Election 2024*. Conference Paper. Proceeding of Eighth International Congress on Information and Communication. Springer
30. Serfaty, I.N. (2022), Understanding grotesque transparency as a strategy for fundamentalist radicalization: implications for Social Marketing Theory and Practice. *Social Marketing Quarterly*, 28(4).

31. Sunstein, C.R. (2018), Is social media Good or Bad for democracy? *International Journal on Human Rights*. 15(27).
32. Todd, E. (2008), *Après la démocratie*. Gallimard.
33. Van Hoek, F., Bossuyt, J. (1993), Democracy in sub-saharan Africa: the search for new institutional set-up. *African Development Review* 5(1), 8-93.
34. Von Neumann, J., Morgenstern, O. (1944), *Theory of games and Economic Behavior*. Princeton University Press.
35. Wormser, G. (2017), *Facebook et la crise des élites*. Erudit.org.
36. Zakaria, M., Aoun, C., Linginlal, D. (2021), Objective Sustainability Assessment in the Digital Economy: An information Entropy Measure of Transparency in Corporate Sustainability Reporting. Sustainability, Vol 13, N. 3.

EXPLORING ECO-DESIGN STRATEGIES IN ITALIAN DESIGN-DRIVEN FIRMS

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Abstract

Given the growing emergence of environmental challenges, firms must reduce environmental impacts and achieve business performance. Hence, we investigate how environmental sustainability approaches relate to design-driven innovation (DDI) in the context of new product development, focusing on active design-oriented firms in Italy's industrial sector. This paper, in particular, addresses to what extent eco approaches to design are adopted and connected to new product development in these innovation-driven firms, and how such approaches relate to innovation, customer value creation, and business performance. These relationships are examined through an empirical investigation of the Italian manufacturing companies associated with the Industrial Design Association (ADI, Associazione del Design Industriale), from the entrepreneurial perspective. The study reveals three different clusters of companies with varying levels of adoption of eco-design approaches and a combination of such approaches. One cluster reveals the highest level of adoption of all the types of approaches, the second a high level of adoption of three types of approaches (durability, reduction, recycling), and a low level of adoption of the other three types (reparability, disassembling, regeneration) and a third cluster performs a medium level of adoption of all the types of approaches. Further, we discovered that from the entrepreneur's perspective, firms adopting design for durability and design for recycling approaches positively and significantly impact innovation, customer value and business performance. By identifying diverse eco-design approaches in design-oriented enterprises, the study offers a significant contribution to understanding the relationship between design-driven innovation and environmental sustainability.

1. Introduction

This paper investigates environmental sustainability approaches in design innovation among small and medium-sized enterprises (SMEs). Innovations with reduced environmental impacts are a must in current competitive contexts for several industries in transition (Karimi Takalo *et al.*, 2021; Takacs *et al.*, 2022). SMEs play a key role such as in Europe's industrial fabrics, "providing two out of three jobs, and are central to the success of this new industrial approach" (European Commission, 2020a, p. 2).

Design as a source of product innovation is becoming more and more important for competitiveness (Moultrie and Livesey, 2014; Dan *et al.*, 2018), prosperity, and well-being (European Commission, 2020b), and its importance is documented in several European nations, especially those with a strong tradition in design like Italy or Sweden (Verganti, 2003, 2017; Fondazione Symbola, 2022, 2023). Yet, more action is called for towards sustainability in practice (European Commission, 2023; Jevnaker and Olaisen, 2022a). Among the European countries Italy has the highest number of design services (about 30,000) serving more than 60% of the domestic demand, especially furniture and automotive firms (Fondazione Symbola, 2023). This makes Italian industrial firms interesting and relevant to study from a design-intensive innovation perspective.

In addition to market-pull and technology-push strategies for product innovation, Verganti (2003) introduced a third kind of innovation guided by design, which is characterized by the novelty of the message delivered to the users and design language is significant and prevalent compared to the novelty of functionality and technology (Verganti, 2003, 2017).

Firms adopting design-driven innovation (DDI) approaches work closely together with designers to create breakthrough products that add new and unsolicited meaning that users love because they are so different from other products that dominate the market (Verganti, 2003, 2017). However, design is a relatively recent or revived topic in management studies and requires further deepening, especially empirical investigation (Conti *et al.*, 2019; Verganti, 2003, 2017; Jevnaker *et al.*, 2015).

Currently, being innovative is not enough as firms have to face new challenges: increasingly interested customers in environmental issues, legislation changes, environmental pollution, and a reduction of natural resources (Karimi Takalo *et al.*, 2021). At the same time, firms increasingly see environmental factors as opportunities to stimulate innovation, drive business efficiency and improve brand positioning (Santolaria *et al.*, 2011). Indeed, firms that integrate green product offerings are more likely to gain extended financial gains, thus leading them to improve their business performance (Pérez-Luño *et al.* 2019; Singh *et al.*, 2020), and ecological performance (El-Kassar and Singh, 2019).

However, there is still limited research to understand the relationship between business, environment and innovation and even less between these variables and eco-design strategies (Santolaria *et al.*, 2011; Takacs *et al.*, 2022). In Europe, some studies show that Germany, Denmark, Netherlands, Austria and Sweeden are clear front-runners about method development, dissemination and education in eco-design (Tukker *et al.*, 2001). Previous research on the perception of Spanish innovation-driven companies about sustainability and eco-design revealed that process companies focus their eco-design

strategies on improvement of activities in their factory subsystem (recycling and waste minimization, efficient use of technology), and product companies focus their eco-design strategies on the environmental improvement of materials (recyclable, recycled and low environmental impact materials) and less on other life cycle stages while service companies minimize resource and office automation recycling (Santolaria *et al.*, 2011).

Hence, for firms that seek to achieve eco-effectiveness as well as eco-efficiency and market share through design innovation, existing research points to multi-faceted factors such as resources, capabilities, and investments (see e.g., Conti *et al.*, 2024; Jevnaker and Olaisen, 2022b), new as well as enduring design innovation efforts and learning in design collaboration (Jevnaker, 2000, 2012). Further, engaging in design innovation also possibly enacts a certain degree of ethical responsibility or environmental sustainability orientation (Varadarajan, 2017), and coherence with the society in which they operate (Oduro *et al.*, 2022).

Eventually, management and knowledge-oriented practitioners as well as researchers are becoming aware of the increasing importance of sustainability (Jevnaker and Olaisen, 2022c; Tukker *et al.*, 2001). For example, McKinsey & Company recognizes sustainability as a strategic priority that carries significant business opportunity and risk and suggests that success is more likely when executives enable sustainable organizations to engage actively and strategically, being responsible for creating measurable impact (De Smet *et al.*, 2021).

The Ecodesign Directive (European Commission, 2009) has intended to foster substantial benefits to businesses, consumers, and the environment over the years. In 2021, the directive's implementation across 31 product groups led to a significant reduction in energy costs, saving EU consumers approximately EUR 120 billion. Additionally, these measures facilitated a 10% decrease in annual energy consumption for the targeted products (EC/Directorate-General for Communication, 2024).

Recent reports of the Association of Industrial Design (ADI, Associazione del Design Industriale) stressed the increasing attention of designers to environmental sustainability in design-related projects for companies (Fondazione Symbola, 2022, 2023). However, little attention has been paid to understanding how to innovate in practice while being environmentally sustainable, and contributions investigating sustainability and DDI (Verganti, 2017) are even more underexplored (see, e.g., Conti *et al.*, 2024). Thus, our focus in this study is to empirically investigate which and to what extent eco approaches to design related to new product development are adopted by design-driven companies. Further, we investigate how these approaches relate to innovation, value creation for customers, and business performance from the entrepreneurial perspective.

To achieve these objectives, an exploratory study was conducted based on a survey addressing companies that are strongly design-oriented and belong to ADI. This study helped the authors to have a deeper understanding of the kinds of green strategies design-oriented firms adopt to develop new products and shed light on the relationship between design-driven innovation and environmental sustainability.

The subsequent sections of this article review the literature on green innovation and design-driven innovation by addressing the kinds of eco-design strategies followed in the industrial firms' design approaches, which is the gap the study aims to fill. The methodology section describes the explorative, quantitative approach implemented through the cluster analysis and regression analysis of the set of 86 design-oriented Italian firms. The findings section shows the underlying patterns of eco-design approaches emerging from the analysis of these firms. Finally, the discussion and conclusion explain the

importance of the evidence that emerged from data analysis with suggestions for future research.

2. Theoretical background

2.1 Green Innovation and Eco-design Strategies

In this article, we seek to understand the idea of green innovation from the perspective of "green innovation approaches" and the types of strategies connected to new product development. The literature on green innovation is wide and examines the phenomenon from different perspectives (Dangelico, 2016; Karimi Takalo *et al.*, 2021; Oduro *et al.*, 2022). Authors use various terms such as "green", "environmental" or "sustainable" innovation to indicate the reduced negative impact of innovations on the environment (Dasgupta, 2021). Eco-design is defined as "the systematic incorporation of life cycle considerations into the design of products, processes or services" (Tukker et al, 2001) and is regarded to play a strategic role in innovation-driven firms adding value to the firm's strategy (Santolaria *et al.*, 2011, p. 1315). Previous research has analyzed mainly a few relations between business and the environment (Loorbach *et al.*, 2009).

Furthermore, the emergent literature usually refers to sustainable development within business as green management (Singh *et al.*, 2020; Song and Yu, 2018). Companies that implement green management make improvements to their goods, manufacturing processes, and organizations in the ecosystem. To put it in another way, to respond appropriately to the transformation of the environment and transform challenges into opportunities, firms must adequate their strategies, organization, products, marketing, and finance (Zhang and Ma, 2021).

According to Dangelico and Pujari (2010), green innovation is defined as innovation in either software or hardware relating to green products or processes. This perspective includes innovation in technologies that aim to save energy, protect against pollution, enable waste recycling, and develop green products, or improve corporate environmental protection. To face continuous changes in the competitive environment in the era of (customer attention towards) environmentalism, green innovation's potential to create a corporate competitive edge is strategic. Green innovation might begin with creating products and adopting manufacturing processes that protect the environment and promote product distinctiveness (e.g., Kotler and Alexander Rath, 1984). Hence, it is fundamental to figure out how to get a distinct competitive edge by pursuing green innovation (Aron and Molina, 2020).

We follow Ottman *et al.* (2006, p. 24) who argue that "although no consumer product has a zero impact on the environment, in business the terms 'green product' or 'environmental product' are commonly used to describe those that strive to protect or enhance the natural environment by conserving energy and/or resources and reducing or eliminating the use of toxic agents, pollution, and waste". The definition stresses that green products may focus on different environmental issues such as energy, material/resources, and pollution/toxic waste (Roy, 1996). Other literature has stressed that green products and green processes are positively correlated to competitive advantage (Chen *et al.*, 2006). Further, companies that pay more attention to the environment are generally more innovative and entrepreneurial than their competitors (Etsy and Wilson, 2006; Santolaria *et al.*, 2011). The key environmental focus may impact the environment at different stages

of the product's life cycle – manufacturing processes, product use, and disposal (Dangelico and Pujari, 2010). It is also worth noting that sustainability-oriented innovation can vary and evolve among enterprises, for example, from short-term internal optimization to longer term systemic changes with linkages beyond the company borders (Adams *et al.*, 2016).

Overall, we recognized at least three key research gaps in the existing green innovation studies. First, the literature reveals that there is little knowledge of how companies integrate environmental sustainability into new products (Dangelico and Pujari, 2010; Santolaria *et al.*, 2011). Secondly, research was done on single projects, rather than on programs or cycles of efforts (Rupasinghe *et al.*, 2023). Thirdly, research is mostly conducted on large companies and technological sectors and is often quantitative studies (Passaro *et al.*, 2023). These research gaps motivated our research orientation, which we elaborate on next.

2.2 *Understanding design-driven innovation in context*

Design innovation has attracted new strategic interest in our uncertain times with global/local, digital, and material transformations. In particular, design-driven innovation (DDI) regards design as a causal force that is oriented towards creating new or renewed configurations and their communicative meanings. Design-driven products when involving designerly competent contributions tend to integrate various attributes such as functionality, technology, aesthetics, and meanings (Bloch, 2011; Verganti, 2017) and can satisfy customers looking for high-quality products, as well as abundant hedonistic and semiotic benefits (D'Ippolito, 2014; Luchs & Swan, 2011).

However, firms seem to struggle with taking actionable steps towards sustainability (Jevnaker and Olaisen, 2022a; Tukker *et al.*, 2001), and eco-design strategies in DDI in real-world firms seem hitherto sparsely researched and not well known (Conti *et al.*, 2024).

A recent study has stressed that sustainability is considered by some entrepreneurs an important attribute of new design product development that creates value for customers (Conti *et al.*, 2019). Other recent studies focused on how broader ecological considerations could become integrated in business enterprises, according to organization development, ecological effectiveness and other relevant perspectives (Jevnaker and Olaisen, 2022a, b). These eco-design considerations can contribute to innovation qualities that are becoming both necessary and important for firm competitiveness (Santolaria *et al.*, 2011). However, DDI in practice is still understudied in management studies (Verganti, 2017) and contributions regarding uncovering its relationship with environmental sustainability are still scarce (Conti *et al.*, 2024; Jevnaker and Olaisen, 2022a, b). We will address DDI as a kind of innovation with a potential high relationship with the environment, generally, it refers to complex or even radical innovations and very original design work (Verganti, 2003). It is thus often characterized by the central role of designers or design teams (Jevnaker, 2000, 2005), as well as highly creative individuals immersed in a very creative network of actors (referred to as the design discourse) (Verganti, 2003, 2017).

Italian DDI companies belong to the Made in Italy sectors that are highly innovative and dynamic to face international competition. In the context of design, recent studies promoted by the Italian Association of Industrial Design (ADI, Associazione del Design Industriale) stressed the key role of environmental sustainability in designer projects and six different eco-design approaches (Fondazione Symbola, 2022, 2023). Further, Compass d'Oro has dedicated a special section to environmental sustainability projects, so the association has been promoting since many years the culture of environmental

sustainability. It would further be interesting to understand the perspective of entrepreneurs including their concurrent strategies and also gaps and further possibilities.

DDI companies are characterized as highly innovative through design, as designers and other collaborators help companies to make radical innovation. The designer and the network of actors may capture and anticipate the needs and desires of users, or even transform the users' problems and wants (Jevnaker, 2005, 2012; Verganti, 2003). It seems that some designers and partners are aware of and experiment with selective environmental issues (Jevnaker and Olaisen, 2022a, b), which helps understand user interest in green innovation.

However, the research on DDI lacks a deeper understanding of how design-driven companies include environmental concerns in new products.

2.3   *Framing Eco-design strategies in design-driven innovation*

From the above paragraphs, it is clear that design-driven companies must integrate environmental considerations in new product development strategies to be competitive. Hence, these companies have to face many challenges identified in the literature on green product innovation (Dangelico and Pujari, 2010) such as avoiding trade-offs between product quality and green attributes (Olson, 2013), selling at a competitive price (if green products may require high development and manufacturing cost) and the lack of customer awareness of green product benefits.

Together with conventional attributes such as functionality, technology, aesthetics, meanings (Bloch, 2011; Verganti, 2017), high quality, hedonistic and semiotic benefits D'Ippolito, 2014; Luchs *et al.*, 2012), design products must include environmental sustainability considerations relating to consuming natural resources at a rate below the natural regeneration, or consuming a substitute, generating limited emissions, and not being engaged in activities that can degrade the ecosystem (Karimi Takalo *et al.*, 2021; Kleindorfer *et al.*, 2009). A recent study has stressed that sustainability is considered by some entrepreneurs an important attribute of new design product development, which creates value for customers (Conti *et al.*, 2019).

The previous literature underlines that designers must still develop skills and guidance to design for the new circular economy (Charnley *et al.*, 2011) and that good design practice should consider sustainable issues connected to product design (e.g. the use of recyclable materials, low consumption of energy, user-friendly material, etc.) as key elements of competitiveness (Bumgardner and Nicholls, 2020). Recent practitioners report stress that industrial designers are developing green skills (Fondazione Symbola, 2022, 2023) and the government is incentivizing sustainability together with ADI Associazione del Design Industriale which has created a dedicated award for sustainable design products. However, to our knowledge, there are no studies that identify the eco-design strategies of these companies.

Since there is no consensus regarding a single definition of eco-design, this study adopts the perspective that eco-design is a practice that consists of the systematic incorporation of life cycle considerations into the design of products, processes, or services (Tukker *et al.*, 2001). More specifically, this practice is performed by the developers of a product and is aimed at reducing a product's negative environmental impact during its entire life cycle (Schäfer and Löwer, 2021).

Several effective strategies have been documented to enhance environmental sustainability in product design. For instance, Cerdan *et al.* (2009) describe the

implementation of straightforward indicators designed to enhance product recyclability. Furthermore, foundational principles and guidelines such as "reduce, reuse, recycle" (RRR) and "pollution prevention pays" (PPP) have been advocated by Boks and Stevels (2007) to minimize ecological impact. Additionally, the adoption of "eco-materials" which are more environmentally benign, has been explored by Cicconi (2020) as a means to further reduce the environmental footprint of products.

Hence, eco-design strategies play a fundamental role in innovative-driven companies, adding sustainable value to their strategy (Santolaria *et al.*, 2011). For example, specific eco-design strategies toward the sustainability of Spanish companies have been identified (Santolaria *et al.*, 2011) related to main company clusters: process, product, and service. In particular, process companies focus their eco-design strategies on the improvement of their activity in the factory subsystem (efficient use of technology, recycling, waste minimization), and product companies pay attention to the environmental improvement of materials (recyclable, recycled, and low environmental impact materials). Finally, service companies focus their design strategies on the minimization of resources and office automation recycling (selective waste connection, double-sided printing, e-mail billing, and advertising).

Given the challenging nature of green innovation (Passaro *et al.*, 2023), it is important to underline that especially SMEs lack the skills and resources (Kanda *et al.*, 2018). Many techniques have been proposed to adopt and apply eco-design in product development (Knight and Jenkins, 2009) but it seems that they are "tools for experts" and are quite generic.

A study of ADI (Fondazione Symbola, 2022) adopted a checklist to identify various approaches to environmental sustainability in designers' projects, which appears appropriate to our study. This list includes several types of eco-design strategies or approaches such as:

- "design for durability" (the product or its methods of use are designed in such a way as to improve its maintainability, physical and emotional duration);

- "design for reduction" (the products minimize the use of materials and energy and the production of waste);

- "design for recycling" (reduction of the quantity of materials used, use of mono-materials, use of easily recyclable materials and regenerated materials, ease in the separation of materials);

- "design for repairability" (replacement of components or updating of their functions is permitted);

- "design for disassembly" (the aim is to design products using reversible connection systems, functional to the separation of all the components of the different types of materials to facilitate the recovery and recycling process);

- "design for regeneration" (functional to the re-manufacture of products with the same or different function of use, or to the design of modular products to facilitate the reuse of parts of the product).

As this list of strategies was employed to determine which approaches are predominantly used by Italian designers who serve design-driven companies, we believe that this measurement tool is also suitable for assessing the extent of strategy adoption by firms from the entrepreneurs' perspective.

In this study, we assume that entrepreneurs of design-driven companies make strategic decisions related to the eco approaches to design and may encourage and motivate employees and collaborators to innovate in this green direction. Leadership has been suggested to be an important factor affecting innovation (Gil *et al.*, 2018) and several studies have shown that transformational leadership positively influences organizational innovation (Gumusluoğlu and Ilsev, 2009).

In this paper, a survey on Italian design-driven companies was carried out adopting the checklist proposed by ADI to investigate the types and the level of adoption of these approaches. Hence, we investigate the types and levels of adoption of eco-design strategies suggested by ADI from the subjective perspective of the entrepreneur. Furthermore, the paper aims to explore the relationship between specific eco-design approaches (and their combinations) and several key factors: the level of firm innovation, the impact of environmental sustainability of products and processes on customer value creation, and business performance, as perceived by entrepreneurs.

In particular, the research questions are the following.

RQ 1. *What types of sustainable design approaches characterize manufacturing design-driven companies?*

RQ 2. *How much do the identified clusters differ by type of product, company size, and revenue within manufacturing design-driven companies?*

RQ 3. *How much do the identified clusters of eco-design approaches relate to the level of innovation of the firm, the positive impact of environmental sustainability of products and processes on customer value creation, and business performance, from the entrepreneurial perspective?*

3. Methodology

We answered the research questions through an online survey conducted on a sample of Italian manufacturing design-driven companies which are members of the Association for Industrial Design (ADI – Associazione del Disegno Industriale).

Based on the literature on eco-design approaches, a questionnaire consisting of three sections was designed. The first section contains questions about the company profile (product types, company size, and revenue class) and the second investigates the level of adoption of the different types of eco-design approaches by the firms based on the checklist proposed by ADI explained in paragraph 2.3. (design for durability, reduction, recycling, reparability, disassembling, regeneration). The questions in the third section are designed to gauge entrepreneurs' perceptions of the firms' level of innovation, the positive impact of environmental sustainability of products and processes on customer value creation, and business performance.

To respond to multiple-choice questions, entrepreneurs were asked to indicate the relevance of the statements using a five-point Likert scale, where 1 represents "not at all" and 5 represents "very much".

A sample of 86 companies belonging to a total of 146 ADI companies was collected in the period July 2022 - January 2023. Personalized emails were sent to each company.

The data were analyzed using both cluster analysis and regression analysis. Specifically, hierarchical cluster analysis was conducted using the R software to categorize sample companies into distinct groups. We implemented Topsis analysis (the Technique for Order of Preference by Similarity to Ideal Solution), a method that evaluates various criteria, choosing four criteria with the highest performance out of approximately forty. These criteria, detailed by Bernard Desgraupes (2017) in the "Clustering indices" section of the Clustercrit package in R, include Criterion 1 - C-Index Silhouette, Criterion 2 - Silhouette Index; Criterion 3 - Xie & Beni Index and Criterion 4 - Dunn Index. Additionally, the k-medoid method in R was utilized, employing a heuristic approach to identify initial medoid seeds for k-medoid clustering.

Additionally, regression analysis was conducted to explore the relationships between the cluster identified and three variables from the third section of the questionnaire. These variables include the firm's level of innovation, the positive impact of environmental sustainability of products and processes on customer value creation, and business performance. The coefficient values presented in the table of findings correspond to a significance level of 0.05.

4. Results

The characteristics of the sample are described in Table 1. In particular, the largest slice of the sample consists of small and medium-sized companies that manufacture mainly consumer products and with predominant revenue classes 10-49 and <5 million Euros.

Table 1 – Sample descriptive statistics

Product Type	n	%
Consumer product	55	63.95
Industrial product	16	18.60
Components	15	17.44
Company size		
Micro (<9 employees)	13	15.12
Small (10-49 employees)	25	29.07
Medium (50-249 employees)	31	36.05
Large (> 250 employees)	17	19.77
Revenue class (mil. Euros)		
< 5	20	23.26
5-9	9	10.47
10-49	32	37.21
50-99	12	13.95
100-199	5	5.81
200-400	4	4.65
>400	4	4.65

Note: N =86

Table 2 offers descriptive statistics relating to the typology of eco-design approaches adopted, which entails design for durability, design for reduction, design for recycling, and so forth, that is, six respective categories in total. On average, a firm in the sample analyzed adopts a quite good level of eco-design approaches of 3.68, on a 1-5 Likert scale, especially about design for durability (4.49).

Table 2 - Descriptive statistics of eco-design approaches in the firms studied (N= 86).

Eoc-design approach/ Descriptive statistics	Design for Durability	Design for Reduction	Design for Recycling	Design for Reparability	Design for Disassembling	Design for Regeneration
Minimum	3.000	1.000	1.000	1.000	1.000	1.000
1st Quantile	4.000	3.000	3.000	3.000	2.250	2.000
Median	5.000	4.000	4.000	4.000	3.000	3.000
Mean	4.488	3.744	3.965	3.442	3.326	3.116
3rd Quantile	5.000	5.000	5.000	4.000	4.000	4.000
Maximum	5.000	5.000	5.000	5.000	5.000	5.000
St. Dev.	0.650	1.030	0.890	1.000	1.190	1.090

As introduced, we used cluster analysis to identify possible underlying patterns in the responses of the 86 firms. The cluster analysis results based on the Topsis analysis method indicate that a three-cluster solution appeared to be appropriate. Therefore, we identified three groups of design-driven companies with a different combination of eco-design approaches.

The graphic representations consisting of a dendrogram (Fig. 1), a plot box (Fig. 2), and a silhouette (Appendix 1), together with a brief description using the medoid values, and the most frequent answers over the threshold value of 65.16%, are presented. The graphic representations show that the data is divided into three groups of approximately equal size. All points in the three clusters have large silhouette values (approximately 0.6 or greater), indicating that the clusters are well separated. The cluster analysis thus identified three   clusters of companies with a specific combination of eco-design approaches adopted. It consists of 40 companies in Cluster 1, 17 companies in Cluster 2, and 29 companies in Cluster 3.

Figure 1 - Dendrogram
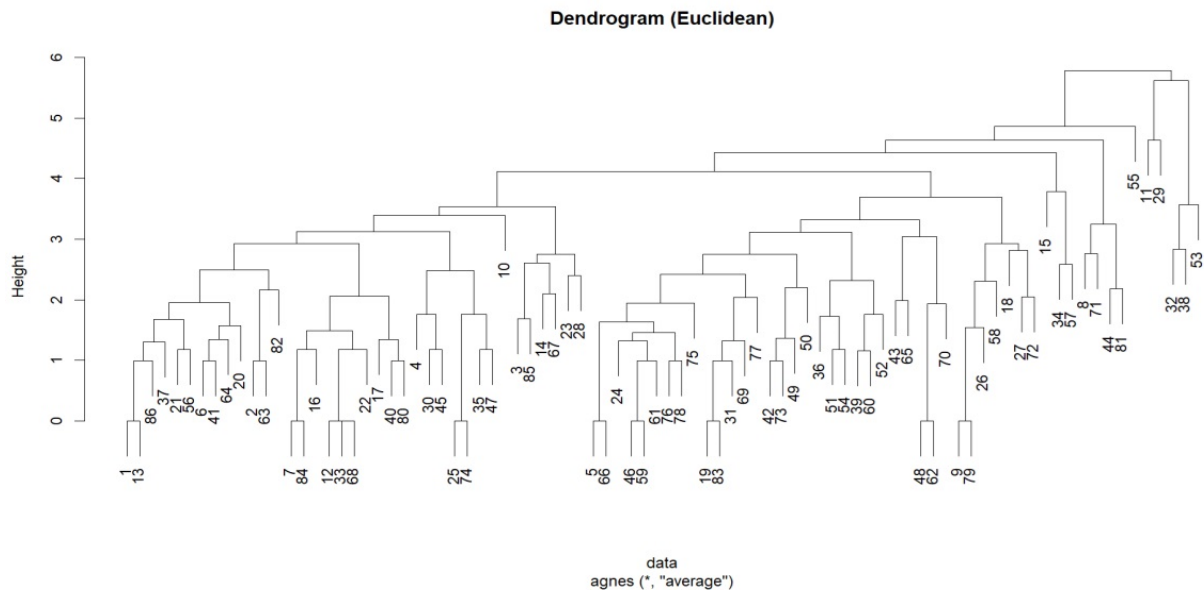
Source: authors elaboration (N=86 firms).

Figure 2 – Box plot

Source: authors elaboration.

The semantics adopted to identify clusters are described below in Table 3. In particular, medoids were used. Medoids are representative objects of a cluster within a data set whose sum of dissimilarities to all the objects in the cluster is minimal.[1]

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[1] Source: https://en.wikipedia.org/wiki/Medoid.

Table 3 – The semantics adopted to determine the clusters in the data set of 86 firms

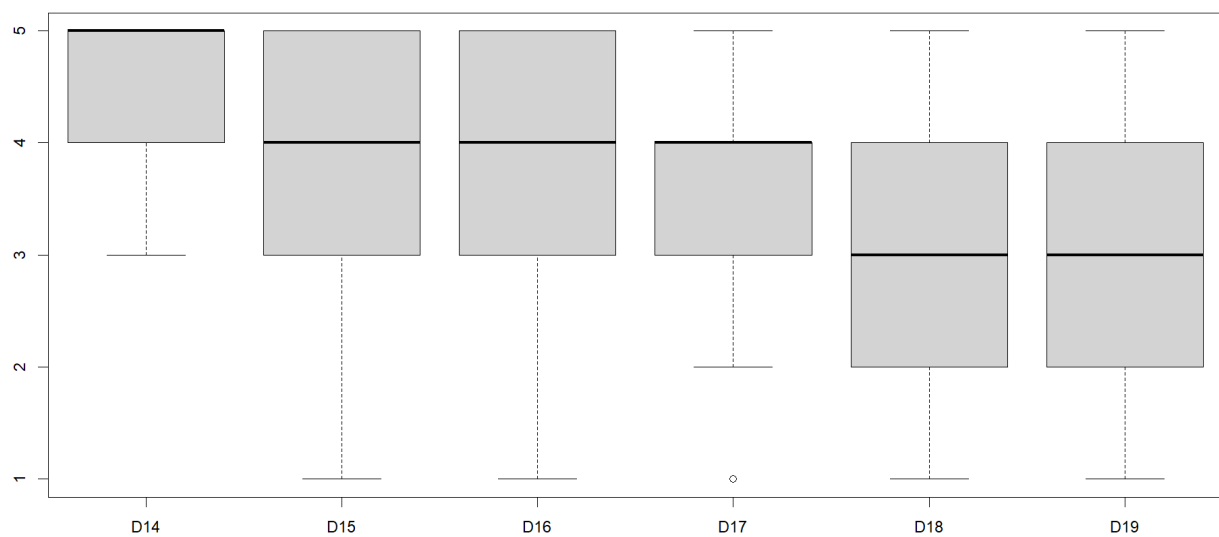| Cluster	Durability	Reduction	Recycling	Reparability	Disassembling	Regeneration
1	5	4	4	4	4	4
2	5	4	4	2	2	2
3	4	3	3	4	3	3
1	13			12		
2	13			6		
3	10			10		
1	HIGH			HIGH		
2	HIGH			LOW		
3	MEDIUM			MEDIUM		

Note: Value from 3 to 6: LOW
          Value from 7 to 11: MEDIUM
          Value from 12 to 15: HIGH

Therefore, Cluster 1 (40 firms) is characterized by a high presence of all eco-design approaches and for this reason these firms have been named "The highest eco-green design firms". Firms of Cluster 2 (17 firms) are highly sustainable because of the adoption of three approaches (durability, reduction, recycling) but low levels of more sophisticated approaches to design e.g. reparability, disassembling and regeneration. For this reason, we named this cluster "The traditional eco-green design firms".

Finally, the third cluster (29 firms) is characterized by medium adoption of all the six types of design approaches suggested by ADI. This cluster has been named "The medium eco-green design firms". Then, the characteristics (or illustrative variables) of each cluster (type of product, company size, revenue class) were provided (Table 4) and finally, regression was performed to understand the relationship of each cluster with some variables (Table 4).

Table 4 – Descriptive characteristics of the clusters identified (N=86 firms)

Variables	All firms	Cluster 1	Cluster 2	Cluster 3
Types of Product				
Component	17.44%	17.50%	35.29%	6.90%
Consumer product	63.95%	62.50%	47.06%	75.86%
Industrial product	18.60%	20.00%	17.65%	17.24%
Company Size				
Micro	15.12%	15.00%	17.65%	13.79%
Small	29.07%	37.50%	17.65%	24.14%
Medium	36.05%	27.50%	47.06%	41.38%
Large	19.77%	20.00%	17.65%	20.69%
Revenue class (mil. euros)				
<5	23.26%	25.00%	23.53%	20.69%
5 - 10	10.47%	10.00%	11.76%	10.34%
11 - 50	37.21%	32.50%	47.06%	37.93%
51 - 100	13.95%	20.00%	5.88%	10.34%
101 - 200	5.81%	5.00%	5.88%	6.90%
201 - 400	4.65%	2.50%	0.00%	10.34%
>400	4.65%	5.00%	5.88%	3.45%

Cluster 1 (40 firms) is made mainly of small (37.50%) and medium firms (27.50) and manufacturing consumer products (62.50%) followed by industrial products (20%). The prevalent revenue classes are 10-50 million euros (32.50%) and <5 million euros (25%).

Cluster 2 (17 firms) consists mainly of medium firms (47%) and firms manufacturing both consumer products (47 %) and components (35%).

Cluster 3 (29 firms) is represented by medium (41.28%) and small firms (24.24%). This is the cluster with the highest percentage of firms manufacturing consumer products (75.86%). Prevailing revenue classes are 10-50 and <5 million euros.

Finally, a regression analysis was performed (Table 5) to understand the entrepreneurs' opinions on how the adoption of the various eco-design strategies adopted by firms relates to the following variables: the level of innovation of the firm ("innovation"), the positive impact of sustainability of products and processes on value creation for customers ("value creation"), and the positive impact of sustainability of products and processes on business performance ("business performance").

Table 5 – Regression analysis results from the study of 86 firms in the Italian sample

Variable	Eco-design approach	All firms	Cluster 1	Cluster 2	Cluster 3
Innovation	Durability	0.518	0.394	0.626	
	Reduction				
	Recycling	0.356		0.659	0.365
	Reparability				
	Disassembling				
	Regeneration				0.288
Customer Value	Durability	0.398	0.029	0.681	0.421
	Reduction		0.040		0.395
	Recycling	0.318		1.023	
	Reparability	-0.186			0.722
	Disassembling	0.321			0.744
	Regeneration				0.359
Business Performance	Durability	0.296	0.384	0.664	
	Reduction	0.165	0.292		
	Recycling	0.266			
	Reparability				
	Disassembling	0.319	-0.189		0.574
	Regeneration		0.384		0.371

Source: authors elaboration

The regression analysis across all 86 firms investigated indicate that only the design for durability and the design for recycling approaches have a positive and significant impact on innovation, customer value, and business performance from the entrepreneur's perspective. The design for disassembling approaches significantly enhances both customer value and business performance. Conversely, the design for reduction approach

significantly benefits business performance alone, while the design for reparability negatively and significantly affects customer value.

Considering the three clusters we identified in this Italian sample of design-oriented firms, the regression reveals that the main differences among clusters concern the impact on value creation for customers. Firms in Cluster 3 demonstrate significance for five out of six eco-design approaches (except for recycling), whereas firms in Clusters 1 and 2 only show significance for two eco-design approaches. Specifically, Cluster 2 exhibits significance for durability and recycling, and Cluster 1 for durability and reduction, both with lower coefficients compared to the former cluster.

More specifically, concerning innovation, the regression across all companies shows significance only for design for durability and recycling, with different coefficients (0.518 for durability and for 0.356 recycling). Typically, an increase of one point in Durability increases innovation by about half a point, and a similar increase in Recycling enhances it by approximately a third of a point. In Cluster 2 (sum1 = High, sum2 = Low), both variables exert the same degree of influence, around 0.6. For Cluster 1, the design for recycling is no longer significant, and the design for durability reduces its influence on innovation. In Cluster 3 (sum1 = Medium, sum2 = Medium), the influence of the design for durability disappears, and the significance of regeneration emerges while maintaining the impact on recycling. This variation also indicates that the three clusters are different.

Regarding business performance, the regression analysis across all companies indicates that the design for durability and recycling both significantly impact business performance, with each having a similar degree of influence (approximately 0.26). In Cluster 1, reduction, recycling, and regeneration each show a positively significant impact. Meanwhile, in Cluster 2, only the design for durability is significant, and it has a higher coefficient (0.664). Finally, in Cluster 3, only the design for disassembling and regeneration approaches shows a positive and significant influence.

5.   Discussion of the results

The study's results enabled us to address the research questions, beginning with RQ1, which explored whether there are differences in the adoption of eco-design approaches within the design practices of design-oriented manufacturing companies and their product strategies.

 Our study reveals a quite high level of adoption of eco-design approaches by these Italian firms. However, it also uncovers significant heterogeneity in sustainable design practices, as evidenced by the identification of three distinct clusters. The first and largest cluster classified as "The highest eco-green design firms" exhibits the highest level of adoption of eco-design strategies, the second cluster, named "The traditional eco-green design firms", demonstrates a level of adoption between high and medium and the third one, known as "The medium eco-green design firm", shows a medium level of green design. It is noteworthy that Cluster 1 adopts all eco-design approaches investigated, while Cluster 2 and 3 primarily use three specific strategies: design for durability, recycling and reduction.

Accordingly, these clusters highlight both similarities and differences in the composition of the eco-design approaches employed. In particular, our first result shows that the highly design-oriented companies in Italy have different strategies for product

design, but the majority of them adopt mainly design for durability, design for recycling and design for reduction.

This result suggests that the latter type of eco-design strategy is intuitively simpler to implement and less costly. The less adopted design approaches are design for disassembling, design for reparability and design for regeneration. For instance, designing products for disassembly typically demands more effort in the initial design stages and production phases of new product development compared to design for recycling, which may simply involve using recyclable raw materials.

Consequently, the landscape of the design world in Italy exhibits considerable diversity regarding green product innovation strategies. Hence, this somewhat less visible result in a set of Italian design-oriented firms suggests that sustainable design approaches are not uniformly adopted due to variations in firms' product or process designs, managerial cultural differences, and varying levels of environmental sensitivity. Furthermore, more comprehensive sustainability and green innovation approaches may entail perceptions of incurring higher costs and inherent risks and inherent risks (Takacs *et al.*, 2022), although benefits surpassing the expectations may emerge over time (Jevnaker and Olaisen, 2022b).

The study also addressed RQ2 by investigating whether the identified clusters display subtle differences in firm characteristics. We found that firms within the three clusters exhibit slight variations in their company profile attributes, namely size, types of products, and revenue classes. While there are no pronounced differences among the clusters, Cluster 3, followed by Cluster 2, predominantly consists of firms that manufacture consumer products. Conversely, Cluster 2 has a significant number of firms that specialize in manufacturing components. Cluster 1 has the highest concentration of small firms. It is the cluster with the highest level of adoption of eco-design strategies. This finding indicates that the demographic characteristics of the design-oriented firms do not significantly influence eco-design strategy. Instead, factors such as the cultural orientation of the business, entrepreneurial mindset, and the design innovation capabilities and interactions of the personnel and design collaborators are likely more important (see, e.g., Jevnaker, 2000, 2012; Landoni *et al.*, 2016).

Finally, RQ3 aimed to identify any potential differences among clusters and their relationship with the perceived level of innovation for Italian entrepreneurs, the perceived impact of environmental sustainability on customer value and business performance. We found that the most positive and significant impact for all clusters is innovation, followed by customer value and business performance. The analysis also reveals differences in the impact of adopted eco-design approaches on firm innovation, sustainability for customer value creation, and business performance. Specifically, firms of Cluster 1 predominantly view eco-design strategies as having a significantly positive impact on innovation and business performance. Firms of Cluster 2 consider sustainability strategy impacting all three variables, from innovation to customer value and business performance Finally, according to entrepreneurs of Cluster 3 showing the lowest level of green-strategies adoption, these strategies impact first customer value through three approaches: design for reparability, disassembling and durability followed by business performance.

6. Theoretical contribution

The analysis of the results suggests some theoretical and managerial implications. From the theoretical point of view, the study enriches the literature on design-driven innovation (among others Verganti 2003, 2017; D'Ippolito, 2014; Luchs and Swan, 2011) about the various eco-design strategies adopted in new product development. No or few previous studies have to our knowledge investigated the level of adoption and the combination of eco-design approaches practised in many contemporary design-oriented firms, in a data set with mainly SMEs and with responses from the company entrepreneurs' perspectives.

Thus, our study allows a possibly deeper understanding of the design-driven innovation processes (Verganti, 2017) in the current era, where environmental sustainability is essential for competitiveness (European Commission, 2023; Takacs *et al.*, 2022).

Further, it sheds light on the relationship between innovation and environmental sustainability, providing a more nuanced portrayal of both similar and differentiated eco-design approaches, thus enriching the green innovation literature (among others Dangelico, 2016; Oduro *et al.*, 2022).

Our empirical study also contributed to understanding the complex relationship among working towards realizing environmental sustainability, design product strategy, innovation, customer value, and business performance, areas of significant interest for practitioners (Fondazione Symbola, 2022, 2023).

From the managerial point of view, this study shows the importance of enhancing eco-strategies to design in general that needs to include also the dynamic, collaborative designer and enterprise relations in contexts (Jevnaker, 2012), thus suggesting entrepreneurs and their partners adopt new approaches to manage environmental issues, such as waste management and treatment, less use of virgin materials and hazardous chemicals, (re)use of eco-friendly materials, and use of environmental and statistical tools to measure and advance their improvements (see, e.g., Jevnaker and Olaisen, 2022a, b).

Further, design-oriented companies should improve meaningful marketing and communication practices to make consumers more aware of the eco-design-based products' value (Conti *et al.*, 2019). The issue seems above all to be at a cultural level (for example, Verganti, 2003). In general SME entrepreneurs from all sectors in Italy pay less attention to marketing and consider it a cost rather than an investment (Conti *et al.*, 2019). To this scope, eco-design-competent consultants, such as specifically design, creative marketing and strategic communication agencies should contribute to teaching these sustainability-enhancing skills and practices to entrepreneurs and their collaborators (Pickett-Baker and Ozaki, 2008; Conti *et al.*, 2024).

Finally, it is fundamental to develop enhanced sustainability-oriented collaborations with stakeholders at all levels (Varadarajan, 2017), including trade associations such as ADI and related enterprises. Specifically, design firms are asked to enhance and communicate their environmental responsibility and green strategies by contributing to cultural change through communication that associates the relevant design attributes of products with their eco-friendly characteristics.

7.   Limitations and future research directions

This study reveals that the Italian design-oriented firms explored exhibit a relatively high level of eco-design strategies in new product development, according to entrepreneurs. Despite identifying three distinct clusters of firms ranging from high to medium levels of adoption, showcasing a certain level of heterogeneity, the most prevalent cluster demonstrates the highest level of adoption.

Additionally, we discovered numerous combinations of six eco-design approaches, yet all sampled firms primarily employ three: design for durability, design for reduction, and design for recycling. Rather than a comprehensive eco-designing, this result indicates even design-oriented industrial firms are following a fairly limited set of eco-design approaches. It could be hypothesized that these approaches are comparatively easier to adopt than the remaining three investigated; that is, design for reparability, disassembly, and regeneration.

The novelty of this study lies in being among the first to investigate these aspects within design-oriented industrial firms thereby enriching the management literature, business innovation and sustainability literature on design-driven innovation (DDI) and green innovation. Grounded in the identified patterns of groups of design-oriented industrial firms not yet implementing several eco-design approaches, the study also draws some essential implications such as trying out as well as learning (Gil *et al.*, 2018; Jevnaker *et al.*, 2015) a fuller range of eco-designing in practice, which could also help overcome potential firm barriers (Takacs *et al.*, 2022).

Accordingly, this survey study's Italian sample of design-oriented industrial firms (86 of 146 in total) as represented by ADI-member firms that were mainly SMEs with entrepreneurs' responses was both highly interesting and relevant to our study's exploratory aim.

However, there are limitations to the research. The most notable for the use of clustering and regression analytical methods is the limited sample size, and a broader sample would enhance the results and enable further analysis. Future research should also use qualitative methods, like case studies, to delve deeper into seminal design developments (Jevnaker, 2012; Verganti, 2017) as well as the wider implementation of eco-design practices among the most environmentally focused design-driven companies. That said, the most differentiated eco-design of companies typically needs to be tailor-made – whereas not going towards a fuller range of eco-design alone seems critical (Jevnaker and Olaisen, 2022a; Karimi Takalo *et al.*, 2021), which is why we need deeper insights into real-world design innovation practices in and between groups of firms.

Appendix 1

Figure 1 - Graphic representations of the Cluster analysis "design approaches" from R software
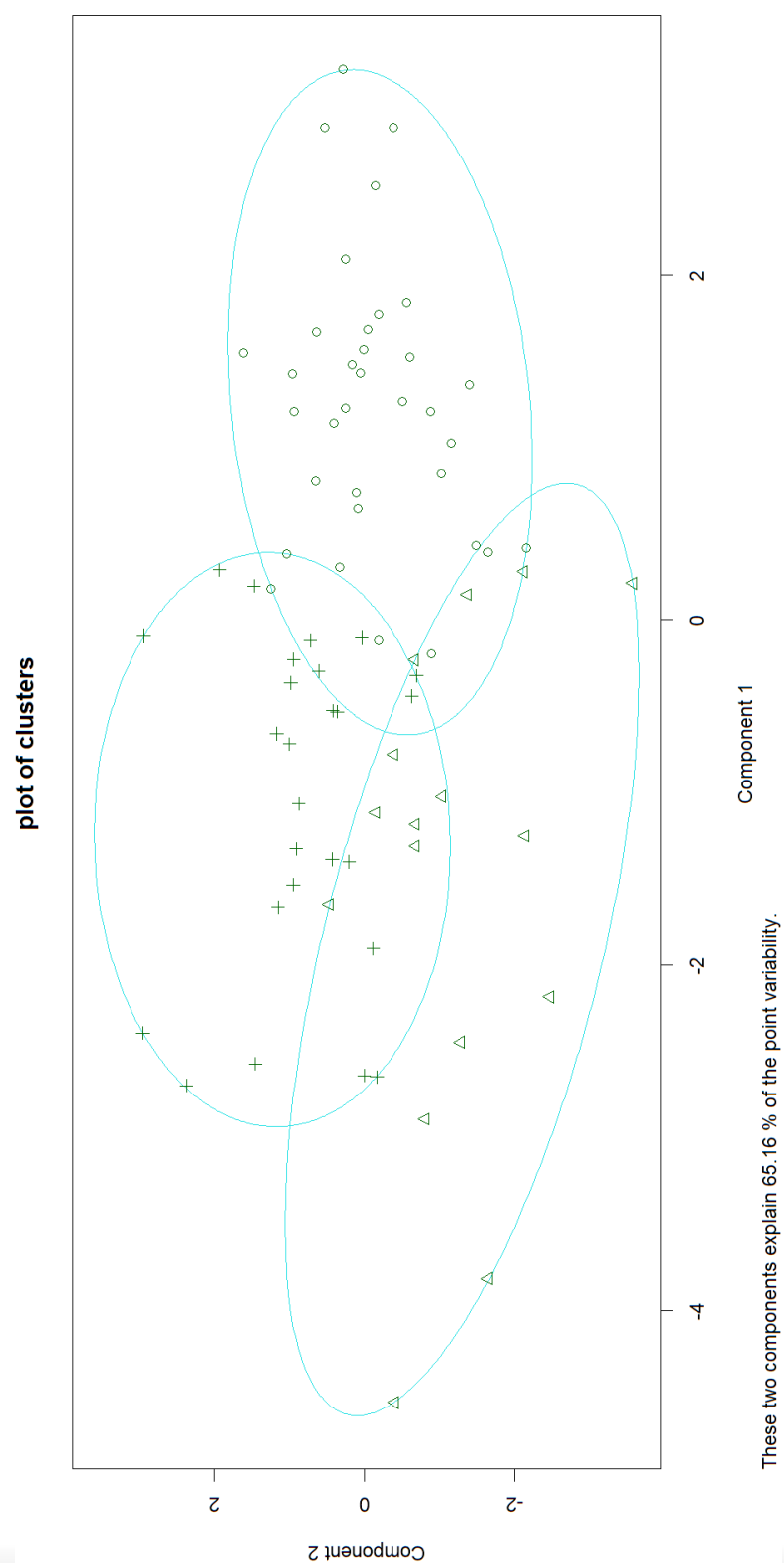
Source: authors elaboration.

References

1. Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. (2016). Sustainability-oriented Innovation: A Systematic Review: Sustainability-oriented Innovation. *International Journal of Management Reviews*, *18*(2), 180–205. https://doi.org/10.1111/ijmr.12068.

2. Aron, A. S. & Molina, O. (2020). Green innovation in natural resource industries: The case of local suppliers in the Peruvian mining industry. *The Extractive Industries and Society*, 7(2), 353-365. https://doi.org/10.1016/j.exis.2019.09.002.

3. Bloch, P. H. (2011). Product Design and Marketing: Reflections After Fifteen Years. *Journal of Product Innovation Management*, *28*(3), 378–380. https://doi.org/10.1111/j.1540-5885.2011.00805.x.

4. Boks, C., & Stevels, A. (2007). Essential perspectives for design for environment. Experiences from the electronics industry. *International Journal of Production Research*, *45*(18–19), 4021–4039. https://doi.org/10.1080/00207540701439909.

5. Bumgardner, M. S., & Nicholls, D. L. (2020). Sustainable Practices in Furniture Design: A Literature Study on Customization, Biomimicry, Competitiveness, and Product Communication. *Forests*, *11*(12), 1277. https://doi.org/10.3390/f11121277.

6. Cerdan, C., Gazulla, C., Raugei, M., Martinez, E., Fullana-i-Palmer, P. (2009). Proposal for new quantitative eco-design indicators: a first case study. *Journal of Cleaner Production* 17(18), 1638-1643. https://doi.org/10.1016/j.jclepro.2009.07.010.

7. Cicconi, P. (2020). Eco-design and Eco-materials: An interactive and collaborative approach. *Sustainable Materials and Technologies*, 23, e00135, https://doi.org/10.1016/j.susmat.2019.e00135.

8. Charnley, F., Lemon, M., & Evans, S. (2011). Exploring the process of whole system design. *Design Studies*, *32*(2), 156–179. https://doi.org/10.1016/j.destud.2010.08.002.

9. Chen, Y.S., Lai, S.B., Wen C.T. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *Journal of Business Ethics* 67(4):331-339. DOI:10.1007/s10551-006-9025-5

10. Conti, E., Vesci, M., Crudele, C., & Pencarelli, T. (2019). Design-driven innovation, quality, and customer value in manufacturing companies. *The TQM Journal*, *31*(6), 968–986. https://doi.org/10.1108/TQM-01-2019-0032.

11. Conti E., Jevnaker, B. H., Camillo F., & Musso F. (2024). Traditional and environmentally friendly attributes in products of highly design-oriented firms: An exploratory study in the perception of Italian entrepreneurs. *The TQM Journal*, 36(9), 114-135. Doi: 10.1108/TQM-09-2023-0306.

12. Dan, S. M., Spaid, B. I., & Noble C. H. (2018). Exploring the Sources of Design Innovations: Insights from the Computer, Communications and Audio Equipment Industries. *Research Policy*, 47(8), 1495-1504. https://doi.org/10.1016/j.respol.2018.05.004.

13. Dangelico, R. M. & Pujari, D. (2010). Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability. Journal of Business Ethics, 95, 471-486.

14. Dangelico, R. M. (2016). Green Product Innovation: Where We Are and Where We Are Going: Green Product Innovation. *Business Strategy and the Environment*, *25*(8), 560–576. https://doi.org/10.1002/bse.1886.

15. Dasgupta, M. (2021), Sustainable innovation initiatives by small and medium enterprises: a systematic literature review. *Journal of Small Business & Entrepreneurship* 35(1), 1-24. DOI:10.1080/08276331.2021.1898177.

16. Desgraupes, B. (2017). *Cultural Indices*. University Paris Ouest Lab Modal'X.

17. De Smet, A., Gao, W., Henderson, K., & Hundertmark, T. (2021). Organizing for sustainability success: Where, and how, leaders can start. *McKinsey & Company article*, August 10, 2021. https://www.mckinsey.com/capabilities/sustainability/our-insights/organizing-for-sustainability-success-where-and-how-leaders-can-start#/

18. D'Ippolito, B. (2014). The importance of design for firms′ competitiveness: A review of the literature. *Technovation*, *34*(11), 716–730. https://doi.org/10.1016/j.technovation.2014.01.007.

19. El-Kassar, A.N., & Singh, S. K. (2019). Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. *Technological Forecasting and Social Change*, 144, 483-498. https://doi.org/10.1016/j.techfore.2017.12.016.

20. Etsy, D. C. & Wilson, A. S. (2006). *Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage*. Yale University Press.

21. European Commission (2020a). Making Europe's businesses future-ready: A new Industrial Strategy for a globally competitive, green and digital Europe. Press Release. *Communication from The Commission* to The European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of The Regions. Brussels, 10 March, 2020. https://ec.europa.eu/commission/presscorner/detail/en/IP_20_416

22. European Commission (2020b). A new industrial strategy for Europe. *Communication from The Commission* to The European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of The Regions. Brussels, 10 March 2020. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF

23. European Commission (2023). *Communication*: A Green Deal Industrial Plan for the Net-Zero Age. Document 52023DC0062, 1. Febr. https://commission.europa.eu/document/41514677-9598-4d89-a572-abe21cb037f4_en.

24. European Commission (EC) (2024). New law to make products on the EU market more sustainable. News Article, Directorate-General for Communication 19 July. https://commission.europa.eu/news/new-law-make-products-eu-market-more-sustainable-2024-07-19_en, accessed 19 July, 2024.

25. European Commission (2009). Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009. Establishing a Framework for the Setting of Ecodesign Requirements for Energy-Related Products. *Official Journal of the European Union* L 285, 31 October 2009, 10-25. http://data.europa.eu/eli/dir/2009/125/oj.

26. Fondazione Symbola e Deloitte Private e Poli:Design (2022). Design Economy 2022 - Rapporto 2022, https://symbola.net/wp-content/uploads/2022/04/Design-Economy-2022-3.pdfFondazione.

27. Fondazione Symbola e Unioncamere (2023). Io sono Cultura. L'Italia della qualità e della bellezza supera la crisi - Rapporto 2023, https://symbola.net/wp-content/uploads/2023/07/Io-Sono-Cultura-2023-DEF-1.pdf

28. Gil, A. I., Moya, B.R. & Morcillo, B. R. (2018).The effect of leadership in the development of innovation capacity: A learning organization perspective. *Leadership and Organizational Development Journal*, 39(3), 10.1108/LODJ-12-2017-0399.

29. Gumusluoğlu, L. & Ilsev A. (2009). Transformational leadership and organizational innovation: the roles of internal and external support for innovation. *Journal of Product Innovation Management*, https://doi.org/10.1111/j.1540-5885.2009.00657.x

30. Jevnaker, B. H. (2000). How design becomes strategic. *Design Management Journal* (Former Series), 11(1), DMI, Boston, 41-47.

31. Jevnaker, B. H. (2005). Vita Activa: On Relationships between Design(ers) and Business. *Design Issues*, 21(3), 25-48. https://doi.org/10.1162/0747936054406753.

32. Jevnaker, B. H. (2012). Vestiges of design-creation: Inquiry into the advent of designer and enterprise relations. *BI Series of dissertations*, 6, 2012, BI Norwegian Business School, Oslo.

33. Jevnaker, B. H., Tellefsen, B., & Lüders, M. (2015). Front-end service innovation: learning from a design-assisted experimentation. *European Journal of Innovation Management*, 18(1), 19-43. https://doi.org/10.1108/EJIM-09-2013-0089.

34. Jevnaker, B. H., & Olaisen, J. (2022a). *Reimagining Sustainable Organization: Perspectives on arts, design, leadership, knowledge and... project management.* Palgrave Macmillan, Springer. https://doi.org/10.1007/978-3-030-96210-4**.**

35. Jevnaker, B. H. & Olaisen, J. (2022b). Leading for Eco-Effective Business Design: Co-creating Sustainability Development, in Jevnaker, B. H., Olaisen, J., *Reimagining Sustainable Organization*, Palgrave Macmillan, Cham., pp. 111-134. https://doi.org/10.1007/978-3-030-96210-4_6**.**

36. Jevnaker, B. H., & Olaisen, J. (2022c). A comparative study of knowledge management research studies: making research more relevant and creative. *Knowledge management research & practice*, 20(2), 292-303. https://doi.org/10.1080/14778238.2021.2020695.

37. Kanda W., Hjelm, O., Clausen J. & Bienko D. (2018). Roles of intermediaries in supporting eco-innovation. *Journal of Cleaner Production*, 205(20), 1006-1016. https://doi.org/10.1016/j.jclepro.2018.09.132.

38. Karimi Takalo, S., Sayyadi Tooranloo, H., & Shahabaldini Parizi, Z. (2021). Green innovation: A systematic literature review. *Journal of Cleaner Production*, *279*, 122474. https://doi.org/10.1016/j.jclepro.2020.122474.

39. Kleindorfer, P. R., Singhal, K., & Wassenhove, L. N. (2009). Sustainable Operations Management. *Production and Operations Management*, *14*(4), 482–492. https://doi.org/10.1111/j.1937-5956.2005.tb00235.x

40. Knight, P., & Jenkins, J. O. (2009). Adopting and applying eco-design techniques: A practitioner perspective. *Journal of Cleaner Production*, *17*(5), 549–558. https://doi.org/10.1016/j.jclepro.2008.10.002.

41. Kotler, P., & Alexander Rath, G. (1984). Design: A Powerful but Neglected Strategic Tool. *Journal of Business Strategy*, 5(2), 16–21. https://doi.org/10.1108/eb039054.

42. Landoni, P., Dell'Era, C., Ferraloro, G., Peradotto, M., Karlsson, H., & Verganti, R. (2016). Design Contribution to the Competitive Performance of SMEs: The Role of Design Innovation Capabilities. *Creativity and Innovation Management*, 25, 484–499. doi: 10.1111/caim.12165.

43. Loorbach, D., van Bakel, J. C., Whiteman, G., & Rotmans, J., (2009). Business Strategies for Transitions Towards Sustainable Systems. *Business Strategy and the Environment*, 19(2),133–146. DOI: 10.1002/bse.645.

44. Luchs, M. G., Brower, J., & Chitturi, R. (2012). Product Choice and the Importance of Aesthetic Design Given the Emotion-laden Trade-off between Sustainability and Functional Performance: Sustainability and Aesthetic Design. *Journal of Product*

Innovation Management, *29*(6), 903–916. https://doi.org/10.1111/j.1540-5885.2012.00970.x.

45. Luchs, M., & Swan, K. S. (2011). Perspective: The Emergence of Product Design as a Field of Marketing Inquiry*. *Journal of Product Innovation Management*, *28*(3), 327–345. https://doi.org/10.1111/j.1540-5885.2011.00801.x.

46. Moultrie, J., & Livesey, F. (2014). Measuring design investment in firms: Conceptual foundations and exploratory UK survey. *Research Policy*, 43(3), 570-587, https://doi.org/10.1016/j.respol.2013.08.005.

47. Oduro, S., Maccario, G., & De Nisco, A. (2022). Green innovation: A multidomain systematic review. *European Journal of Innovation Management*, *25*(2), 567–591. https://doi.org/10.1108/EJIM-10-2020-042.5.

48. Olson, E. L. (2013). It's not easy being green: The effects of attribute tradeoffs on green product preference and choice. *Journal of the Academy of Marketing Science*, *41*(2), 171–184. https://doi.org/10.1007/s11747-012-0305-6.

49. Ottman, J., Stafford, E., & Hartman, C. (2006). Avoiding Green Marketing Myopia: Ways to Improve Consumer Appeal for Environmentally Preferable Products. *Environment*, 48, 22-36. DOI:10.3200/ENVT.48.5.22-36.

50. Passaro, R., Quinto, I., Scandurra, G., & Thomas, A. (2023). The drivers of eco-innovations in small and medium-sized enterprises: A systematic literature review and research directions. *Business Strategy and the Environment*, 32(4), 1432–1450. https://doi.org/10.1002/bse.3197

51. Pérez-Luño, A., Bojica A. & Gopalakrishnan, S., (2019). When more is less: The role of cross-functional integration, knowledge complexity and product innovation in firm performance. *International Journal of Operations & Production Management,* 39(1), 94-115. DOI 10.1108/IJOPM-04-2017-0251.

52. Pickett-Baker, J., & Ozaki, R. (2008). Pro-environmental products: Marketing influence on consumer purchase decision. *Journal of Consumer Marketing*, *25*(5), 281–293. https://doi.org/10.1108/07363760810890516

53. Roy, R. (1996) Designing a greener product: the Hoover 'New Wave' washing machine range. *Co-design*, 5/6, 34-39.

54. Rupasinghe, L. R., Maldeniyage, P. & Perera, G. D. N. (2023). Systematic Literature Review: On Green Innovation. *Management Journal for Advanced Research*, 3 (6), 9-21. https://doi.org/10.54741/mjar.3.6.2.

55. Santolaria, M., Oliver-Solà, J., Gasol, C. M., Morales-Pinzón, T., & Rieradevall, J. (2011). Eco-design in innovation driven companies: Perception, predictions and the main drivers of integration. The Spanish example. *Journal of Cleaner Production*, *19*(12), 1315–1323. https://doi.org/10.1016/j.jclepro.2011.03.009.

56. Schäfer, M., & Löwer, M. (2021). Ecodesign—A Review of Reviews. *Sustainability*, 13 (1), 315. https://doi.org/10.3390/su13010315.

57. Singh, S. K., Del Giudice, M., Chierici, R., Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, 150, 119762. https://doi.org/10.1016/j.techfore.2019.119762.

58. Song, W., & Yu, H. (2018). Green Innovation Strategy and Green Innovation: The Roles of Green Creativity and Green Organizational Identity. *Corp. Soc. Responsib. Environ. Mgmt.*, 25: 135–150. doi: 10.1002/csr.1445.

59. Takacs, F., Brunner, D. & Frankenberger, K. (2022). Barriers to a circular economy in small- and medium-sized enterprises and their integration in a sustainable strategic

management framework. *Journal of Cleaner Production,* 363, 132227. https://doi.org/10.1016/j.jclepro.2022.132227.

60. Tukker, A., Eder, P., Charter, M., Haag, E., Vercalsteren, A., & Wiedmann, T. (2001). Eco-design: The State of Implementation in Europe – Conclusions of a State-of-the-Art Study for IPTS. *The Journal of Sustainable Product Design*, *1*(3), 147–161. https://doi.org/10.1023/A:1020564820675.

61. Varadarajan, R. (2017). Innovating for sustainability: A framework for sustainable innovations and a model of sustainable innovations orientation. *Journal of the Academy of Marketing Science*, *45*(1), 14–36. https://doi.org/10.1007/s11747-015-0461-6.

62. Verganti, R. (2003). Design as brokering of languages: Innovation strategies in Italian firms. *Design Management Journal*, *14*(3), 34–42.

63. Verganti, R. (2017). *Overcrowded Designing Meaningful Products in a World Awash with Ideas*. MIT Press.

64. Zhang, Q. & Ma, Y. (2021). The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership. *Journal of Cleaner Production*, 292, 126057.

FISCAL INDISCIPLINE, POLITICS AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

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Abstract

In this paper, the effects of fiscal indiscipline, politics, and economic growth are examined in 16 sub-Saharan African countries (Nigeria, Ghana, Angola, Congo, Cote d'Ivoire, Ethiopia, Gabon, Kenya, Equatorial Guinea, Burkina-Faso , Mali, Senegal, Togo, Guinea, Gambia, Sierra-Leone) from 2000 to 2021 using panel data analysis. Levin and Lin tests are used to confirm the unit root of selected variables. Based on the stationarity test, the real gross domestic product, the control of correction, the political stability, the exchange rate, and government effectiveness are integrated as orders I(0), I(1), and I(2). Investment and total government consumption are integrated as orders I(1), whereas financial indiscipline is integrated as orders I(2). A Kao Panel Co-integration test also confirmed a long-term relationship between the variables. A study conducted in sub-Saharan Africa shows that fiscal indiscipline, measured by debt to GDP, does not affect economic growth in the first objective. Additionally, the study found that corruption control leads to positive economic growth, while political stability and government effectiveness have no impact. According to the study, the government of this region should maintain fiscal discipline in order to maintain macroeconomic stability, reduce vulnerabilities, and improve aggregate economic performance.

1. Introduction

The impact of fiscal policies on economic growth has been examined in both neoclassical growth models and endogenous growth models (Barro, 1990; Rebelo, 1991; Jones, Manuelli & Rossi, 1993). The fiscal policy of a country plays a critical role in the development and growth of its economy. However, the relationship between fiscal policy and economic growth is significantly impacted by political factors, where government

spending and taxation often determine whether economic growth speeds up or slows down. Since gaining independence, many countries in the Sub-Saharan African (SSA) region have made gradual progress in economic growth, reflecting the efforts of different governments to foster economic development. Economic plans have been formulated over the years, varying across countries and time periods, making the annual budget a vital component of African economies. Emenike & Edirin (2017) argue in their study that budgets may influence the trajectory of economic growth, but the reciprocal relationship between the two remains a subject of debate. Political transformations have occurred in numerous Sub-Saharan African countries, with some transitions towards democracy. Consequently, democratic governance allows for fluctuations in macroeconomic policies while also supporting economic progress by creating a conducive environment for such initiatives.

Burchard (2014) argues that procedural democracies are often seen as a reflection of the number of countries that have shifted from autocratic to democratic rule, without necessarily considering the quality of democracy or the actual benefits gained from it. He suggests that the procedural aspect of democracy has been remarkable but inadequate, especially when considering the electoral competition in Africa. Foresti & Marani (2013) define fiscal indiscipline as the inconsistent fiscal policies practiced by different countries. It is crucial for governments to uphold a fiscal stance that promotes macroeconomic stability and sustainable economic development, while avoiding excessive borrowing and debt accumulation, as highlighted by the IMF in 2018.

In order to fully comprehend and assess the recent developments in fiscal policy in the sub-Saharan Africa region, it is essential to consider certain factors. Siebrits & Calitz (2006) highlight the importance of regional and global contexts, including the economic performance of the region, differing perspectives on the government's role, and the consequences of fiscal policy implementation. The early stages of the SSA's history, both pre- and post-colonial era, saw growth until the mid-1970s (Fosu, 2002). However, real output experienced a decline from an average growth rate of 5.4% (1960-1974) to 2.0% (1975-1999), with annual GDP per capita growth rates of 2.6% and -0.9% respectively during these periods (WGB, 2016). Siebrits & Calitz (2006) argue that these growth rates and the type of growth were not sufficient in addressing poverty in the region. Sub-Saharan Africa has some of the lowest university enrollment rates globally. While governments are investing in education, there is a need to focus on expanding access and enhancing the quality of education to meet the demands of the current workforce. Businesses in Africa often face challenges due to a lack of skilled labor. By investing in technical and vocational education and training, local economies can cultivate a skilled workforce that boosts production and contributes to economic growth (African Development Bank and Organisation for Economic Cooperation and Development, 2008).

Nevertheless, technical and vocational education and training programs in many African nations have struggled to fully recover from the financial constraints faced in the 1980s. Only a small portion, ranging from 2-6%, of educational budgets is allocated to technical and vocational skills development. A study by The African-American Institute on the State of Education in Africa (2015) revealed that a one-year increase in average tertiary education levels in Africa could lead to a 0.39 percentage point rise in annual Gross Domestic Product growth, ultimately resulting in a 12 percent increase in GDP. Over the years, the government has gradually increased education expenditures, from an average of 3.4% in 1999 to approximately 4.5% in 2013, and from an average of 14.61% in 2019 to 14.33% in 2022 (WGB, 2022).

The SSA region saw an increase in the government's final consumption expenditures from 11.7% in 2019 to 12.2% in 2021. Concurrently, the external debt burden in the region is on the rise due to the escalating government expenditures. For instance, in 2016, the debt service in the region surged from 2.5% to 7.14%, and in 2017, it increased from 3% to 4.6% (WGB, 2021). SSA countries exhibit high debt profiles, largely stemming from their elevated debt levels. The region seems to be grappling with prolonged deficits due to the apparent spending patterns in Africa. This points towards an inefficient planning process in the SSA region. Failing to adhere to a disciplined and quality spending plan could hinder the development of the desired fiscal culture, ultimately impacting the economy and national finances. Onakoya & Somoye (2013) attribute spending discrepancies over the years more to misalignment rather than inadequate provisioning. This is evident from the fluctuations in spending observed over time. Significant disparities in spending indicate fiscal irresponsibility, as public funds are not being utilized in line with government budgets, as noted by Granof & Mayper (1991).

In 2005, Nigeria was among the nations that received lender forgiveness, as stated by the IMF (2012). The implementation of the Heavily Indebted Poor Countries Initiative and Multilateral Debt Relief Initiative in 2008 resulted in a two-thirds reduction in sub-Saharan Africa's debt (Gill & Karakulah, 2018). By 2012, the median debt level in the SSA stood at 30% of GDP. The availability of credit enabled the development of infrastructure and implementation of economic policies. In 2017, Chad, Mozambique, South Sudan, Sudan, and Zimbabwe faced severe economic challenges, prompting multilateral organizations to address debt management issues. Several economies, including Ethiopia, Cameroon, Ghana, Kenya, Mauritania, and Zambia, have been cautioned to limit their public expenditures (Gill & Karakulah, 2018). Currently, the median debt-to-GDP ratio exceeds 50%. Although this may appear relatively low compared to global economies, it reflects the poor debt repayment capacity of African economies due to the accumulation of high interest rates. Consequently, they struggle to service these debts (IMF, 2018).

Figure 1 − Sub-Saharan total debt service % GNI
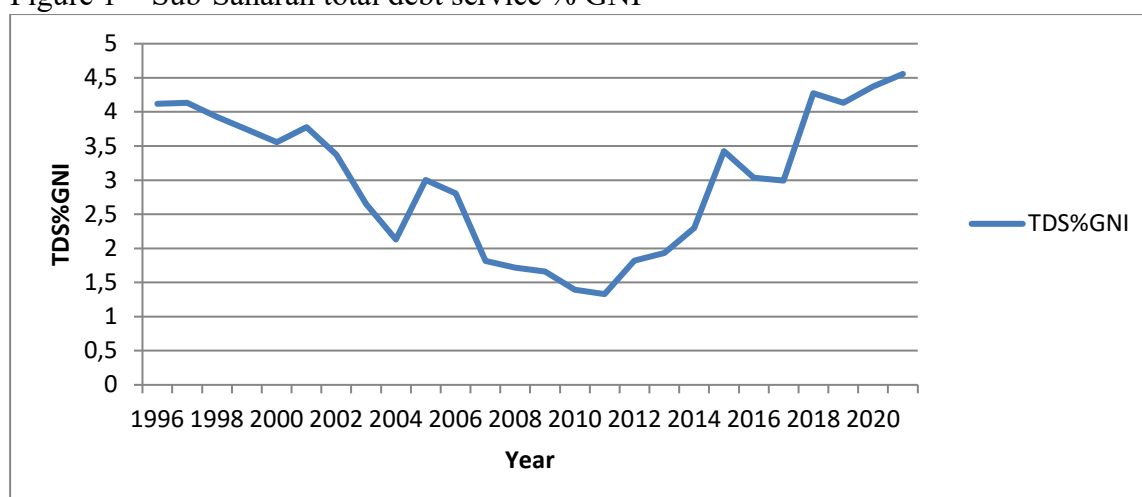
Source: (WDI, 2021)

SSA countries face an increased market risk due to a noticeable rise in debt sources and difficulties in the debt recovery process if they fail to effectively manage their debt burdens (IMF, 2018). Public debt can be measured in three distinct ways. The initial

measure is the static measure of the government's indebtedness, which calculates the ratio of gross public debt to gross domestic product. The second measure is a dynamic assessment of how rapidly the ratio of public debt to gross domestic product changes, while the third measure focuses on the sustainability of the debt, specifically the difference between the interest rate and the rate of economic growth (Gill & Karakulah, 2018). It is important to note that each method has its own restrictions. Sub-Saharan African nations have not been able to generate a surplus since 2012, which is necessary to reduce domestic public debt. This is due to worsening debt dynamics in Africa, including increasing deficits, slow growth, and rising interest rates. In 2016, per capita growth in sub-Saharan Africa was negative for the first time in nearly two decades, and there is no sign of a positive growth rate in 2018 (Gill & Karakulah, 2018).

Various authors, such as Macek & Janku (2015), Babalola (2015), Abubarkar (2016), Benanaya, Khaled, Rachid & Badreddine (2014), Alex & Ebieri (2014), Muritala & Taiwo (2011), Adefeso, Hakeem & Salawu (2010), Emranul & Osborn (2007), Kalle (2007), Babalola & Aminu (2011), Bose, Emranul & Osborn (2007), and Osborn (2007), have conducted studies on fiscal policy in a specific country, as well as in West African and sub-Saharan countries. While a minority of studies has shown a negative impact of fiscal policy on economic growth, the majority have found a positive impact. This study aims to explore the relationship between budget implementation, politics, and economic growth, taking into account factors such as debt levels, exchange rate stability, and other macroeconomic indicators in SSA countries.

This study will analyze the economies of 16 sub-Saharan African countries from 2000 to 2021. The countries included are Nigeria, Ghana, Angola, DRC, Cote d'Ivoire, Ethiopia, Gabon, Kenya, Equatorial Guinea, Burkina-Faso, Mali, Senegal, Togo, Guinea, Gambia, and Sierra-Leone. The study will focus on indicators such as the debt-to-GDP ratio and the deviation of expenditures from revenues to measure fiscal discipline. Other factors like exchange rates, GDP growth rates, and governance indicators will also be considered, with data sourced from the World Bank's World Development Indicators and World Governance Indicators.

The objective of the study is as follows:

1) To investigate the nexus between sub-Sahara Africa's fiscal indiscipline and her economic growth.

2) To examine if the political performance of the sub-Sahara Africa region in the face of debt actualization account for economic growth.

2. Politics and fiscal policy indiscipline

The term politics encompasses various meanings that are descriptive and non-judgmental. However, it is often associated with unethical conduct (Joseph, 2014). Political activities involve governing a country, exercising power over a community, and promoting one's political views through negotiations, legislation, and sometimes force (Hammarlund, 1985; Hawkesworth & Kogan, 2002; Steven, 2012; Blanton & Kegley, 2016; Brady, 2017). Politics is present at different social levels, from traditional societies to modern governments, companies, and even international relations. Decisions are typically made to

benefit members of sub-Saharan African groups, although some African nations do not follow democratic governance.

The African continent is still grappling with severe political and socioeconomic disparities despite numerous ongoing challenges, including ethnic divisions, poverty, and debt. Some African nations have struggled to implement reforms due to issues like corruption, weak institutions, internal conflicts, and an unresponsive political system. In recent years, there has been notable progress in achieving political stability in post-colonial African politics. The fiscal discipline in Sub-Saharan Africa is greatly impacted by the interplay between political decisions and fiscal policies. Both fiscal and monetary policies are subject to political influences globally. It is commonly observed that governments tend to increase spending during election periods, thereby manipulating fiscal policies (Drazen, 2001). Campos & Pradhan (1996) have identified key factors essential for sound fiscal management. It is acknowledged that budgeting and financial management cannot be completely shielded from political pressures. Developing and implementing institutional frameworks that enhance political engagement and encourage fiscal responsibility is crucial in managing the intersection between politics and budgeting. Fiscal mismanagement can arise in the absence of a robust framework for sound fiscal policies.

3. Review of literature

3.1 Theoretical literature

The classical view
The issue of fiscal deficit may appear novel, but it has actually been extensively studied for over two centuries. In his book "An Inquiry into the Nature and Causes of the Wealth of Nations" published in 1776, Adam Smith (1723-1790) delved into the concept of deficit. Smith argued that budgets should be balanced and this equilibrium should serve as a benchmark for government budgets. However, he acknowledged that this standard could be violated during times of war or other necessary circumstances. To address the deficit, Smith proposed the utilization of borrowing instead of taxation. He believed that governments' ability to borrow would lead to a greater inclination towards engaging in warfare. Smith emphasized that if governments raised funds through taxes rather than borrowing, they would not only reduce the deficit but also avoid the negative consequences of excessive borrowing (Smith, 1776). Smith analyzed various factors that contributed to government fiscal deficits, including the desire of government officials to spend, the difficulty in increasing taxes and the reluctance to do so, as well as the willingness of capitalists to lend. According to Smith, fiscal deficits result in public debts that ultimately undermine the prosperity of all great nations in Europe. Prior to Keynes' General Theory of 1936, the prevailing economic thought did not support government spending for stabilization purposes.

Smith (1776) argues that a distortion occurred in the allocation of a certain portion of the yearly output, which was originally intended for maintenance labor. This distortion was addressed by borrowing funds from the public to finance government expenditures. According to Smith, saving and spending are interconnected, as one person's saving becomes another person's investment. In the classical scenario, an increase in government spending leads to a rightward shift in the IS curve. As a result, the equilibrium interest rate rises, while the velocity of money income remains unchanged. In this situation, the higher

interest rate diminishes private investment spending. However, the increase in government expenditure is exactly counterbalanced by this effect.

According to Smith, it's important to keep a balanced budget to make sure the government spends money responsibly. This rule was created because in the past, governments spent too much money and went into debt. However, there are times, like during a war, when it's okay for the government to spend more money than it has. If we don't stick to a balanced budget, spending could get out of control. Even though our economy is growing, we always want more than we can afford. It's important to have simple rules for managing money, but just balancing the budget every year isn't always enough. Sometimes unexpected events can affect the budget and cause deficits, like changes in trade or natural disasters.

Aristotle's view on politics
Aristotle, who lived from 384 BCE to 322 BCE, was a renowned Greek philosopher, logician, and scientist. During the years 335 to 323 BCE, he penned some of his most significant works, such as the Politics. Those who are well-versed in this body of knowledge can utilize it effectively. The task of drafting a city-state's constitution is crucial for a politician acting as a lawgiver. Citizens must abide by laws, customs, and institutions, including monetary and fiscal policies, as well as moral education systems. Political leaders must uphold the constitution, implement reforms when necessary, and prevent any actions that could destabilize the political system. Aristotle places greater value on legislative science than on routine political activities like passing decrees. He believes that having a ruling authority is essential for maintaining order in any community. The governing principle, as outlined in the constitution, guides political offices, especially the sovereign office. Aristotle argues that every community aims for some good, with the community possessing the most authority striving for the greatest good.

Aristotle thought that politics should focus on helping people achieve their best outcomes and become better individuals. But in many Western countries today, like the United States, Canada, Germany, and Australia, people disagree with this idea. They believe politics is mostly about gaining wealth and power, rather than aiming for the best results. Many also think that politics shouldn't influence people's morals, as it could limit their personal freedom. In Western societies, people rely on the government to keep them safe through police and military forces, so they can freely pursue their own goals.

Fiscal policy is really important in a democratic government because it involves finding a balance between different groups who want to use the government's money for their own benefit. The government uses things like taxes and borrowing to help manage the economy, but it's not always easy to see how these actions are affecting the country's finances. We need to look at all the ways the government is spending and making money to get a true picture of how well they are doing. Just looking at how much money the government has isn't enough to understand the whole situation. We need to think about how the government's choices are impacting people and the economy as a whole.

Solow's growth model
The Solow neoclassical growth model made a significant contribution to the theory of economic growth, earning Robert Solow the Nobel Prize in economics. Unlike the Harrod-Domar model, the Solow model includes both labor and technology as factors in explaining long-term growth. It demonstrates diminishing returns to labor and capital individually, but

constant returns when they are combined. Technological progress is seen as the main driver of long-term growth in this model, with the level of technology considered to be determined externally from other factors.

The standard neoclassical growth model of Solow makes use of an aggregate production function in which

$$Y = K^{\alpha}(AL)^{1-\alpha}$$

In the context of economic analysis, Y denotes the gross domestic product, K stands for the stock of capital (which encompasses human and physical capital), L represents labor, and A signifies labor productivity, which experiences growth at a predetermined rate. Developed nations typically have this rate pegged at around 2% annually. However, for developing countries, this rate may vary depending on whether they are stagnant or progressing towards catching up with developed nations. Given that technological advancements are considered exogenous (at a rate of 2% per year, for instance), the Solow neoclassical model is often referred to as an "exogenous" growth model, in contrast to the endogenous growth approach. The parameter α denotes the elasticity of output concerning capital (indicating the percentage increase in GDP resulting from a 1% increase in human and physical capital). With the assumption that α is less than 1, and private capital is remunerated based on its marginal product, neoclassical growth theory predicts diminishing returns for both capital and labor.

Advancements in technology play a crucial role in boosting a country's economy by enhancing production efficiency. As technology improves, more output is generated through technological advancements, leading to economic growth. Fiscal policies also play a significant role in managing the economy by impacting the level of output, such as gross domestic product. Fiscal expansions can increase demand for goods and services, resulting in higher output and prices. Additionally, political and economic institutions directly influence economic development by affecting investments in capital, technological advancements, and production organization.

3.2 Empirical literature

Ayana (2023) studied how policy-governance indicators and economic growth are connected in 36 Sub-Saharan African (SSA) countries from 2011 to 2021. The research used two-system Generalized Method of Moment (GMM) estimation techniques for panel data analysis. The findings show that the direct economic impact of fiscal policy is negative and significant in SSA countries. On the other hand, the combination of fiscal policy with governance indicators has a positive and significant impact on economic growth. Dikeogu & Bredino (2022) analyzed the fiscal discipline of Nigeria from 1980 to 2015. According to recent fiscal data, the current fiscal situation of the nation suggests a lack of sustainability due to fiscal indiscipline. Evans (2020) utilized the ARDL bounds testing methodology to investigate the impact of ARDL bounds testing on financial development and economic growth in Nigeria from 1980 to 2017, taking into account factors such as corruption, budgeting reforms, fiscal policy sustainability, and crowding-out. The findings suggest that in the short and long term, policy uncertainty, corruption, and fiscal deficits have a detrimental effect on financial development and economic growth. The presence of increased uncertainty, corruption, and fiscal deficits can hinder financial development and

economic growth. Tasnia (2018) utilized the ADRL model and ECM to analyze pooled cross-section time series and panel data spanning from 1980 to 2016. The study focused on investigating the influence of fiscal policy on economic growth in four South Asian countries. Interestingly, government expenditures and tax revenues did not have a significant impact on the real GDP growth of these nations. The economic performance and fiscal discipline are analyzed in Gale & Orszag (2003). The findings reveal two aspects. Initially, there is a decrease in budget surpluses (or an escalation in budget deficits), leading to a reduction in national savings. Secondly, long-term interest rates increase with the rise in projected deficits.

Macek & Janku (2015) studied the impact of fiscal policy on economic growth in OECD countries from 2000 to 2012. Their findings suggest that the effects of government expenditures on economic growth vary depending on the level of fiscal transparency and institutional conditions. In countries with low fiscal transparency, government spending has a positive effect on economic growth, while in countries with high transparency, it has a negative impact. The study also highlights that in countries with inadequate institutional conditions; government spending can have negative effects on taxation and hinder economic growth. Babalola (2015) conducted a study on Nigerian economic development from 1980 to 2013, analyzing the effects of fiscal policy on both short- and long-term growth. Through various statistical methods, it was found that government recurrent expenditures and investments have significant impacts on economic development. While capital expenditures showed some short-term benefits, tax revenue was found to have a negative impact on economic growth in both the short and long term. In Abubakar (2016), the impact of government spending on economic growth in Nigeria was examined using the VECM methodology. According to the findings of his study, public expenditures influenced economic growth in a mixed manner. Public expenditures had a negative impact on economic growth in Nigeria in some areas, while positive effects were observed in others. Obayori (2016) utilized the error correction model approach to analyze the influence of fiscal policy on unemployment in Nigeria. The research findings indicated that both government's capital expenditures and recurrent expenditures had an adverse effect on unemployment in Nigeria. In a study conducted by Osinwo in 2015, the impact of fiscal policy on sectoral growth in Nigeria from 1970 to 2013 was analyzed using the ARDL and ECM methods. The results showed that government expenditures had a positive effect on the output of most sectors, with the exception of agriculture.

Benanaya, Khaled, Rachid & Badreddine (2014) conducted a dynamic panel data analysis to investigate the impact of fiscal policy on economic growth in MENA countries. The study revealed a positive long-term association between fiscal policy and economic growth. The correlation between GDP and budgetary revenue suggests a causal relationship between economic growth and fiscal revenues. However, isolating the specific effects of taxes was challenging in the empirical analysis. Alex & Ebieri (2014) examined the impact of fiscal policy on economic growth in Nigeria using the ARDL method. They found that there is a long-term relationship between Nigerian economic growth and fiscal policy. Government capital and recurrent expenditure have a significant impact on economic growth, while oil taxes, non-oil taxes, and government debt do not have a significant effect on real GDP. Short-term economic growth is mainly influenced by capital expenditures. Arnelyn, Gemma, Minsoo & Donghyun (2014) examined how fiscal policy impacts economic growth in developing Asian countries. They found that the level of taxes and government spending in the region has a greater impact on economic growth compared to

advanced economies. Investments in education positively affect economic growth, while property taxes have a less significant impact. Nathan (2012) studied the relationship between money supply, fiscal deficits, exports, and economic growth in Nigeria from 1970 to 2010. He found that economic growth in Nigeria is closely linked to these factors, suggesting that fiscal policy can be a valuable tool for promoting economic growth in the country.

Adefeso, Hakeem & Salawu (2010) conducted a study on the impact of Nigerian fiscal policy on economic growth between 1970 and 2005. They utilized the error-correction method to test the predictive ability of the endogenous growth model. The study's findings were in line with earlier empirical research conducted in other countries, indicating that government expenditures aimed at productivity enhancement have a positive effect on economic growth Babalola & Aminu (2011) conducted a study on the relationship between public expenditure and economic growth in Nigeria from 1977 to 2009. They used the Engle-Granger test and variables such as real GDP, income tax, capital expenditure, and government consumption expenditure. Their findings showed that productive government expenditure had a significant positive effect on economic growth. Cogan, Taylor, Wieland, & Wolters (2013) identified the measures of fiscal policy to ensure economic growth both in the short and long run. A positive influence of fiscal policy instruments on economic development is indicated in the studies of such domestic scholars as Zapatrina (2007), Lisyak (2009), Boholib (2015), Chugunov (2015); Chugunov&Makogon (2016), etc.

3.3   *Contribution to knowledge*

A comprehensive examination of literature utilizing empirical evidence was carried out for this research. Upon reviewing the literature, it was discovered that the majority of studies focused on the impact of fiscal policy and government institutions or indicators on economic growth, both as individual and cross-country studies employing various analytical methods. As a result, the researchers can assert with confidence that there are limited studies that have explored the relationship between fiscal indiscipline and economic growth independent of politics. Therefore, this study contributes to the existing body of knowledge by investigating fiscal indiscipline, politics (political performance), and economic growth in sub-Saharan Africa using Panel data analysis from 2000 to 2021.

4.   Research methodology

There are many variations of Wagner's theory, including those modified by Peacock and Wiseman (1967), Goffman (1968), Gupta (1967), Michas (1975), Musgrave (1969) and then Peacock and Wiseman as modified by Mann (1980), which all explain why there is a deficit in government spending. While considering the divergence of government expenditure from its revenue course, this research adopts an implied relationship between economic growth and government expenditures.

$rge = f(rgdp)$ by Peacock and Wiseman (1976):

$$rge_t = \alpha_0 + \alpha_1 rgdp_t + u_t \quad \dots (3.1)$$

$$\alpha_1 rgdp_t = \alpha_0 + rge + u_t$$

$$rgdp_t = \frac{\alpha_o}{\alpha_1} + \frac{1}{\alpha_1}rge + \frac{1}{\alpha_1}u_t$$

$$rgdp = \beta_0 + \beta_1 rge + v_t \quad \ldots (3.2)$$

where $rgdp$ is the real GDP, rge is the real government consumption expenditure.

The above model is modified to accommodate measures of fiscal indiscipline. This gives room for the next section.

4.1   Model specification

The model to be estimated is specified here, drawing from the above theoretical framework of Wagner's theory. The modified version of Peacock and Wiseman's (1967) model is given in equation (3.2). Modifications are made to this in the equation (3.3) as a Panel model for the SSA region. This is given explicitly below as:

$$rgdp_{it} = \alpha_0 + \alpha_1 fndx_{it} + \alpha_2 tgcx_{it} + \alpha_3 invs_{it} + \alpha_4 exch_{it}$$
$$+ \alpha_5 gov.ind(cc, ge\ and\ ps) + \mu_{it} \quad \ldots (3.3)$$

where $rgdp$ is the Real GDP, $fndx$ is the fiscal indiscipline index measured by a ratio of debt to GDP, $tgcx$ is the total government consumption expenditure, $invs$ is the gross fixed capital, $exch$ is the exchange rate with the dollar as foreign currency, $gov.ind$ is the interaction of governance indicator (control of corruption, government effectiveness and political stability) (proxy of the political structure).

4.2   Estimation Procedure

Levin and Lin (LL) test
This panel unit root test was created by Levin and Lin (1992). Levin and Lin adopted a test that can literally be viewed as an extension of the DF test. The model form is as follows:

$$\Delta Y_{i,t} = a_i + \rho Y_{it-1} + \sum_{k=1}^{n} \phi_k \Delta Y_{i,t-k} + \delta_{it} + \theta_t + \mu_{it} \ldots (3.4)$$

The model permits for two-way fixed effects, one form the a_i and the other from the θ_t.which makes both unit-specific fixed effects and unit specific time trends. The Unit specific fixed effects are very crucial component due to the permit for heterogeneity because the coefficient of the lagged Yi is deprived to be homogeneous over all units of the panel. The LL test also assumes that the individual processes are independent in cross sectional data.

The null hypothesis of this test states that:

$$H0: \ \rho = 0 \qquad H0: \ \rho = 0$$

Kao test

The Kao (1999) revealed Dick-Fuller (DF) and Augmented Dick-Fuller (ADF)-type tests for co-integration in panel data. According to Kao, the residual-based co-integration test can be adopted.

$$\mu_{it} = e\mu_{it} - 1 + v_{it}$$

Kao (1999) also proposes an ADF test, where one can run the following regression:

$$\mu_{i,t} = \rho\mu_{i,t-1} + \sum_{j=1}^{n} \phi_j \Delta\mu_{i,t-j} + v_{it} ...(3.5)$$

Hausman Test

In this test, we determine which of the pre-assumptions of the model holds true between the fixed effect and the random effect. By doing so, it confirms that the above model can be estimated using the appropriate technique. Below is the null hypothesis to be tested:

H0: Difference in coefficients not systematic (the preferred model is the random effect)

The fixed effect model is preferred because of a p-value less than 0.05 that rejects the null hypothesis. While fixed effect estimates are consistent regardless of whether the difference in coefficients is systematic or not, random effect estimates are inconsistent when the difference in coefficients is systematic but efficient when it is not. If the Hausman test p-value is less than 0.05, then the fixed effect model should be preferred because the coefficient difference is systematic.

$$H = (\hat{\beta}^{FE} - \hat{\beta}^{RE})'[Var(\hat{\beta}^{FE}) - Var\hat{\beta}^{RE})]^{-1}(\hat{\beta}^{FE} - \hat{\beta}^{RE}) \sim \chi^2(\kappa)....(3.6)$$

5. Results and Discussion

5.1 *Panel Unit Root/ Stationarity Test*

In each test, if H0: $\rho = 0$ will accept the null hypothesis say that the variable has a unit root or is not stationary and if H0: $\rho < 0$ will reject the null hypothesis thereby accepting the alternative, saying that there is no presence of unit root or the variable is stationary.

Specification level are noted as * unit root present and ** no unit root present. From Table 1 using the Levin, Lin &Chu (LLC) to test for unit root, real gross domestic product (RGDP), real exchange rate (REXR), political stability (PS), control of corruption (CC) and government effectiveness (GE) are integrated of order I(0), total government consumption expenditure (TGC) and investment (INV) are integrated of I(1) while ratio of debt to GDP (FND) is integrated of order I(2). As a result of these we can proceed to test for co-integration of the variables.

Table 1 − Levin, Lin and Chu (2002), test (individual intercept and trend)

	Level Diff	First Diff	Second Diff	Probability	Order of integration
RGDP	-3.27526**			0.0005	I(0)
FND	0.75100*	-0.19842*	-3.94171**	0.0000	I(2)
TGC	1.55528*	-2.91758**		0.0018	I(1)
INV	0.15006*	-7.86636**		0.0000	I(1)
REXR	-11.9128**			0.0000	I(0)
PS	-8.12248**			0.0000	I(0)
CC	-13.3105**			0.0000	I(0)
GE	-18.5260**			0.0000	I(0)

Source: E-views 10

5.2 Co-integration Test Using the Kao Panel Co-integration Test

The null hypothesis is that there is no co-integration and the alternative hypothesis is that there is co-integration, meaning that the variables have a long-run relationship. If the probability level is less than 5%, the null hypotheses are rejected, otherwise accepted.

From Table 2 is possible to see that the probability of an ADF test is less than 0.05 (5%) which means the null hypothesis must be rejected and the alternative hypothesis accepted. As a result, we conclude that the variables have a long-term relationship. In the regression, we can determine the long-run and short-run relationships.

Table 2 − Co-integration Test

	t-Statistic	Prob.
ADF	-4.101700	0.0000
Residual variance	37.70110	
HAC variance	15.15310	

Source: E-views 10

5.3 Hausman Test

From the Hausman test (Table 3), since the probability is 0.0000 and it is less than 5% (0.05), it means that we reject the null by using the fixed effect for analysis i.e., the fixed effect is consistence and effective.

Table 3 − Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob
Cross-section	37.962720	7	0.0000

5.4 To investigate the nexus between sub-Sahara Africa's fiscal indiscipline and its economic growth

From the panel regression (Table 4), fiscal indiscipline index measured by a ratio of debt to GDP and tgc which is total government consumption expenditure is seen to be negative and insignificant to economic growth in sub-Saharan African countries. While $invs$ which is proxy by gross fixed capital and $exch$ which is exchange rate with the dollar as foreign currency are statistically positively and negatively to economic growth in sub-Saharan African countries. That is to say one percent change in investment (inv) brought about 0.266% increases to economic growth in sub-Saharan African countries and a percentage change in real exchange rate brought about 6.9% decreases to the economic growth in sub-Saharan African countries. From the result above, it can be seen that in sub-Saharan as a whole there has been mismanagement of government revenue and excess of government expenditure that does not contribute to the economic. That is to say there has been fiscal indiscipline in the region, this result confirm to that of Evans (2020), Tasnia (2018), Gale & Orszag (2003), Dikeogu & Bredino (2022), Macek & Janku (2015), Abubakar (2016), and Obayori (2016).

Table 4 − Panel regression (dependent variable: RGEDP; method: panel EGLS cross-section weights)

Var	Coefficient	Std. Error	t-Statistic	Prob.
D(D(FND))	-0.007848	0.008554	-0.917555	0.3596
D(TGF)	0.000171	0.000101	1.694405	0.0912
D(INV)	0.000266	7.84E-05	3.34579	0.0008
REXR	-0.069812	0.026298	-2.654591	0.0084
C	8.565389	1.479526	5.789278	0.0000
Adjusted R^2	0.211704			
Durbin-Watson	1.535431			

Source: E-views 10

5.5 To examine if the political performance of the sub-Sahara Africa region in the face of debt actualization account for economic growth.

From Table 5, the result shows that political stability (PS) and government effective (GE) is seen to insignificant to economic growth in sub-Saharan African countries, that is to say there is no political stability and government effectiveness in political performance in increase the economic growth when it comes to the region of sub-Saharan African countries. The control of corruption (CC) is statistically positively significant to economic growth in the region that is a percentage change in control of corruption brought about an increase in economic growth. This shows that if the control of corruption increases in the region, it will definitely increase the economic growth of sub-Saharan African countries. The fiscal indiscipline also shows a negative significant level to the economic growth in the region, one percentage change in fiscal indiscipline brought about a decrease in

economic growth in the region. These findings also conform to Evans (2020) and Dikeogu & Bredino (2022) results.

Table 5 − Dependent variable: RGDP; method: Panel EGLS (Cross-section weights)

Var	Coefficient	Std. Error	t-Statistic	Prob.
D(D(FND)	-0.039959	0.01463	-2.762949	0.0061
PS	0.751079	0.397410	1.889935	0.0598
CC	2.614229	1.140981	2.291271	0.0227
GE	2.492286	2.523013	0.987819	0.3241
ECM(-1)	-0.267786	0.052030	-5.146796	0.0000
C	8.496409	1.066363	7.967655	0.0000
Adjusted R^2	0.294393			
Durbin-Watson stat	2.013904			

Source: E-views 10

5.6 *Discussion of Findings*

The results from the first objective indicate that there is an insignificant correlation between fiscal indiscipline, government consumption expenditure, and economic growth in sub-Saharan Africa. This suggests that the mismanagement of government revenue and excessive government spending do not positively impact the economy. This aligns with the findings of Evans (2020), Tasnia (2018), Gale & Orszag (2003), Dikeogu & Bredino (2022), Macek & Janku (2015), Abubakar (2016), and Obayori (2016), but contradicts the results of Ayana (2023). Moving on to the second objective, the results reveal that political stability and government effectiveness do not have a significant relationship with economic growth, whereas the control of corruption shows a positive and significant association with economic growth. This implies that political stability and government effectiveness do not necessarily lead to economic growth in sub-Saharan African countries, while an increase in the control of corruption can boost economic growth in the region. This finding is consistent with the studies of Evans (2020) and Dikeogu & Bredino (2022).

6. Conclusions and policy recommendations

In this research, panel data analysis was conducted and following the Hausman test, the fixed effect method was utilized for estimation in order to assess the influence of fiscal indiscipline and politics on economic growth in sub-Saharan nations from 2000 to 2021. The countries included in the sample were Nigeria, Ghana, Angola, DR Congo, Cote d'Ivoire, Ethiopia, Gabon, Kenya, Equatorial Guinea, Burkina Faso, Mali, Senegal, Togo, Guinea, Gambia, and Sierra Leone. The initial objective indicated that fiscal indiscipline, represented by the debt to GDP ratio and government consumption spending, did not significantly impact economic growth in the region. Only investment was found to have a positive and significant effect on economic growth, while the real exchange rate had a negative impact. The second objective revealed that political stability and government effectiveness were not significant, but control of corruption had a positive and significant

relationship with economic growth in sub-Saharan African countries. Additionally, fiscal indiscipline was shown to have a negative impact on economic growth in the region.

Based on the findings, the study recommends that:

(1) To maintain macroeconomic stability, lessen vulnerabilities, and boost overall economic performance, this region's government must practice financial responsibility.

(2) Fiscal restraint is necessary for countries if they want to improve their long-term economic prospects by taking advantage of the opportunities presented by expanding free trade and an open capital market.

(3) The sub-Saharan government likely uses its discretion to carry out its mandates through tax and expenditure decisions, since if it were utilized improperly, it may lead to deficit bias and pro-cyclical policies. These, in turn, may result in fiscal positions, increasing debt levels, and eventually, a decline in the credibility of policy.

References

1. Abubakar, A. B. (2016). Dynamic effects of fiscal policy on output and unemployment in Nigeria: An econometric investigation. *CBN Journal of Applied Statistics*, *7*(2), 101-122.
2. Adefeso, H. A., Hakeem, M. & Salawu, B. (2010) Fiscal policy and economic growth in Nigeria: testing the prediction of Endogenous Growth Model, *Journal of Economic Theory*, *4*(2).
3. Arnelyn, A., Gemma, B.E., Minsoo, L., & Donghyun, P. (2014). Fiscal Policy and Economic Growth in Developing Asia. *ADB Economics Working Paper Series No 412,* October 2013.
4. Ayana, S. D. (2023). Fiscal policy and economic growth in Sub-Saharan Africa: Do governance indicators matter? *PLoS One, 18(11)*). Doi: 10.1371/journal.pone.0293188.
5. Babalola, A. I. (2015). Fiscal policy and economic development in Nigeria. *Journal of Economic and Sustainable Development,6*(7), 150-159.
6. Babalola, S. J., & Aminu, U. (2011). Fiscal policy and economic growth relationship in Nigeria. *International Journal of Business and Social Sciences, 2*(17).
7. Barro, R. (1990). Government spending in a simple model of endogenous growth. *Journal of Political Economy, 98*(5), S103–S125.
8. Benanaya, D., Khaled, R., Rachid, T., & Badreddine, T. (2014). The Impact of fiscal policy on economic growth: Empirical evidence from panel estimation. *The 2014 WEI International Academic Conference Proceedings*, New Orleans, USA.
9. Blanton, S.L., & Kegley, C. W. (2016). World politics: Trend and Transformation, 2016-2017. Cengage Learning.
10. Bogolib, T. (2015). Fiscal policy as an instrument of macroeconomic stability. *Economic Annals-XXI*.
11. Brady, L.P. (2017). *The politics of negotiation: America's dealings with allies, adversaries, and friends*. UNC Press Books.
12. Burchard, S.M. (2014). *Democracy Trends in Sub-Saharan Africa, 1990 to 2014.* Institute for Defense Analysis.
13. Calderon, C., Chuhan-Pole, P. & Lopez-Monti, R. (2017). Cyclicality of fiscal policy in sub-Saharan Africa, Magnitude and Evolution, *World Bank Policy Research Working Paper 8108*.
14. Campos, E., & Pradhan, S. (1996). The impact of budgetary institutions on expenditure outcomes. *Policy Research Working Paper No.*

15. Cass, D. (1965). Optimum growth in an aggregative model of capital accumulation. Review of Economic Studies, 32(July), 233–240.

16. Chugunov, I., & Makogon, V. (2016). Budget policy under economic transformation. *Економічнийчасопис-XXI,* (158), 66-70.

17. Chugunov, I. (2015). The long-term budgetary strategy in the cyclical economic system. *Herald of Kyiv National University of Trade and Economics, 5,64-77.*

18. Cogan, J.F., Taylor, J.B., Wieland, V., &Wolters, M.H. (2013). Fiscal consolidation strategy. *Journal of Economic Dynamics and Control*, *37*(2), 404-421.

19. De Long, J. B., Summers, L. H., Feldstein, M., & Ramey, V. A. (2012). Fiscal policy in a depressed economy [with comments and discussion]. *Brookings Papers on Economic Activity*, 233-297

20. Dewett, K. K., &Navalur, M. H. (2012). *Modern Economic Theory*. New Delhi: S. Chand & Company Ltd.

21. Diab, W.W., Atlam, B., & El Nimer, N. (2016). A critical literature survey of the macroeconomic effects of fiscal policy in light of recent empirical evidence. *Economic and Social Development: Book of Proceedings*, 781.

22. Dikeogu, C., & Bredino, S. (2022). Fiscal discipline and sustainable growth in Nigeria: A reality check for developing countries. *2nd International Conference held on the 5th -7th September 2022.*

23. Drazen, A. (2001). The political business cycle after 25 years, in Bernanke, B. and Rogoff, K. (eds), *NBER Macroeconomics Annual 2000*, Cambridge, MA: MIT Press.

24. Eisner R. (1986), "How real is the federal deficit?" *The Free Press, New York, 14-240.*

25. Emenike, E. E., & Edirin, J. (2017). Budget deficit and fiscal administration in selected sub-Saharan African countries. *Trends Economics and Management, 29*(2), 21-33.

26. Evans, O. (2020). Fiscal discipline, financial development and economic growth in Nigeria. Dynamics of fiscal and monetary policies in ECOWAS countries, in C.I. Nwaogwugwu (Ed), University of Lagos Press.

27. Fölster, S., & Henrekson, M. (1999). Growth and the public sector: a critique of the critics. *European Journal of Political Economy*, *15*(2), 337-358.

28. Foresti, P., & Marani, U. (2013). Fiscal indiscipline and monetary policy in EMU: Is there any Need for a Fiscal Policy Concerned ECB? *International Journal of Monetary Economics and Finance, 6*(1), 81-95.

29. Fosu, A.K. (2002). The global setting and African economic growth. *Journal of African Econmies, 10*(3), 282-310.

30. Frankel, Jeffrey A., Carlos, A. Végh, & Guillermo, Vuletín. (2013). On graduation from fiscal Procyclicality, *Journal of Development Economics, 100*, 32-47.

31. Gale, W. G., & Orszag (2003). The economic effects of long-term fiscal discipline. Discussion Paper No. 8

32. Gemmell, N., Kneller, R., & Sanz, I. (2011). The timing and persistence of fiscal policy impacts on Growth: Evidence from OECD Countries, *Economic Journal, 121*(550). F33–F58.

33. Gill, I & Karakulah, K.(2018). Sounding the alarm on Africa's Debt – Brookings Institution. Retrieved from https://www.brookings.edu/blog/future development/ 2018/ 04/06/sounding-the-alarm-on-africas-debt/

34. Goffman, I. J. (1968). On the empirical testing of Wagner's Law: A Technical Note. *Public Finance, 23*, 259-264.

35. Gollwitzer, S. (2002).Budget institutions and fiscal performance in Africa, *CREDIT Research Paper, 10/02.*

36. Granof, M. H., &Mayper, A. (1991). Current state of government budgets. *The CPA Journal*, *61*(7), 28.
37. Gupta, S. P. (1967). Public expenditure and economic Growth. *Public Finance, 22*, 423-461.
38. Hammarlund, B. (1985). *Politikutan partier: studier i Sverigespolitiska liv 1726-1727* (Doctoral dissertation, Almqvist&Wiksell International).
39. Hawkesworth, M., &Kogan, M. (2002). Encyclopedia of government and politics: 2-volume set. Routledge.
40. Ilzetzki, Ethan & Carlos A. Végh (2008). Procyclical fiscal policy in developing countries: Truth or Fiction? *NBER Working Paper 14191*, July.
41. IMF (2018). *Sub-Saharan Africa: Domestic Revenue Mobilization and Private Investment.* Washington DC: IMF.
42. Jones, L.E., Manuelli, R.E., & Rossi, P.E. (1993). Optimal taxation in models of endogenous growth. *Journal of Political Economy*, *101*(3), 485-517.
43. Joseph, W.A. (Ed.). (2014). *Politics in China: an introduction*. Oxford University Press, USA.
44. Keynes, J.M. (1936). The general theory of employment, interest and money, Harcourt, Brace and Company, New York, 119-20.
45. Konuki, T. & Villafuerte M. (2016). Cyclical behavior of fiscal policy among Sub-Saharan African countries. *The African Department Paper Series. Washington, DC: International Monetary Fund.*
46. Lisyak, L. (2009). Budget policy in the system of government socio-economic regulation in Ukraine.*Kyiv: DNNU AFU. 598* .
47. Macek, R., & Janků, J. (2015). The impact of fiscal policy on economic growth depending on institutional conditions. *Acta academica karviniensia*, 15(2), 95-107.
48. Mann, A. J. (1980). Wagner's Law: An econometric test for Mexico. *National Tax Journal,* 33, 189-201.
49. Medee, P.N. &Nembee, S. G. (2011). Econometric analysis of the impact of fiscal policy variables on Nigeria's economic growth. *International Journal of Economic Development Research and Investment, 2(1), 13-25.*
50. Michas, N.A. (1975). Wagner's law of public expenditures: What is Appropriate Measurement for a Valid Test? *Public Finance, 30*, 77-84.
51. Mikesell, J. (1999) *Fiscal Administration*, New York: Harcourt Brace College.
52. Muritala T. & Taiwo A. (2011): Government expenditure and economic development: Empirical evidence from Nigeria, *European Journal of Business and Management*, *3(9),18-28.*
53. Musgrave, R. A. (1959). *Theory of public finance; A Study in Public Economy*. New York: McGraw-Hill.
54. Muo, I., Abosede, A. J., Ekpudu, J. E., & Amole, B. B. (2019). Leadership styles, organizational politics and employee's commitment in selected public and private organizations in Lgos state, Nigeria. *International Journal of Economic Behavior, 9*(1), 121-135. DOI: https://doi.org/10.14276/2285-0430.2291
55. Musgrave, R. A. (1969). *Fiscal System*. New Haven: Yale University Press.
56. Musso, F. (2022). Human and machines: The replacement of human labour with technology in intellectual activities. *International Journal of Economic Behavior, 12*(1), 1-3. https://doi.org/10.14276/2285-0430.4565.
57. Nathan, P. A. (2012). The impact of fiscal policy on the Nigerian Economy, *International Review of Social Sciences and Humanities*, *4*(1), 142-150.

58. Obayori, J. B. (2016). Fiscal policy and unemployment in Nigeria. *The International Journal of Social Sciences and Humanities Invention*, *3*(2), 1887-1891.
59. Onakoya, A. B., &Somoye, R. O. (2013). The impact of public capital expenditure and economic growth in Nigeria. *Global Journal of Economics and Finance*, 2(1), 1-11.
60. Osebo G. P. (2017). Fiscal policy and economic growth in Ethiopia, *International Journal of African and Asian Studies*, *38, 43-57.*
61. Osinowo, O.H. (2015). Effect of fiscal policy on sectoral output growth in Nigeria. *Advances in Economics and Business*, *13*(6).
62. Osuala, A. E. & Jones, E. (2014). Empirical analysis of the impact of fiscal policy on economic growth of Nigeria. *Int. Journal of Economics and Finance*, *6*(6), 203-211.
63. African Development Bank and Organisation for Economic Cooperation and Development (2008). *African Economic Outlook*, Mauritius.
64. Peacock, A. T., & Wiseman, J. (1967). *The growth of public expenditure in the United Kingdom. London*: George Allen and Unwin.
65. Ram, R. (1986). Government size and economic growth: A new framework and some evidence from cross-section and time-series data. *The American Economic Review*, *76*(1), 191-203.
66. Ramsey, F. P. (1928). A mathematical theory of saving. *The economic journal*, *38*(152), 543-559.
67. Rebelo, S. (1991).Long-run policy analysis and long-run growth. *Journal of political Economy*, *99*(3), 500-521.
68. Rena, R. & Kefela, G. T. (2011). Restructuring a fiscal policy encourages economic growth- A case of Selected African Countries. *East-West Journal of Economics and Business, 14*(2), 23-39.
69. Rena, R. (2006). *Financial institutions in Eritrea*, Dar-es-Salaam (Tanzania): New Africa Press.
70. Romer, Paul M. (1986).Increasing Returns and Long-Run Growth. *Journal of Political Economy*, October 1986, 94(5), 1002-37.
71. Siebrits, K., & Calitz, E. (2006). *The legacy and challenge of fiscal policy in sub Saharan Africa*. Paper presented at the 24th International Economic History Conference. Helsinki.
72. Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations: Volume One*. London: printed for W. Strahan; and T. Cadell, 1776.
73. Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.
74. Steven, L. T. (2012). *30-Second Politics: The 50 most thought-provoking ideas in politics, each explained in half a minute*. Icon Books Limited n. 130.
75. Stevis-Gridneff, M. (2018). More of Africa finds itself in China's Debt. *The Wall Street Journal*. Retrieved from https://www.wsj.com/articles/more-of-africa-finds-itself-in-chinas-debt-1532549741
76. Swan, T. W. (1956). Economic growth and capital accumulation. *Economic record*, *32*(2), 334-361.
77. Talvi, Ernesto & Carlos, A. Végh, (2005). Tax base variability and pro-cyclical fiscal policy in Developing Countries, *Journal of Development Economics 78*, 156-190.
78. Tasnia, S. (2018). *The impact of fiscal policy on economic growth; Empirical evidence from four South Asian countries*. Masters Thesis, Eastern Illinois University.
79. Todaro M. P. (1977). *Economics for a Developing World. Harlow*, Essex, Longman.
80. Zapatrina, I. (2007). *Budget mechanism of economic growth*. Kyiv: Institute of socio-economic strategy [in Ukrainian].

NEW INSIGHT FROM CROSS-SECTIONAL AUTOREGRESSIVE DISTRIBUTION LAG ON THE INTERCONNECTEDNESS AMONG FINANCIAL DEVELOPMENT, FINANCIAL INFLOWS AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

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Abstract

The paper explores the relatedness among financial inflows, financial development, and economic growth in sub-Saharan Africa (SSA) from 1990 to 2019. For the analysis, secondary data from the World Development Indicators (WDI) were used. To account for cross-sectional dependence, preliminary tests such as the slope homogeneity test, the cross-sectional dependence test, and the second-generation panel unit root tests (CADF and CIPS) were performed and these informed the use of cross sectional Autoregressive Distributed Lag (CS-ARDL). The findings from the CS-ARDL analysis revealed that financial development positively influences long-run economic growth but not in the short run. Additionally, remittances and foreign debt inflows had a positive and statistically significant impact on economic growth in the selected SSA countries. However, the influence of foreign direct investment and foreign portfolio investment on economic growth was found to be mixed and not statistically significant. In conclusion, the study establishes

an interconnectedness between financial inflows, financial development, and economic growth in SSA. Nonetheless, it highlights that not all types of financial inflows contribute as expected to the growth of the selected countries in the region.

Keywords: Cross sectional, financial markets, financial inflows, Economic growth.

1. Introduction

Financial inflows and financial development are essential factors that can contribute significantly to economic growth (Levine, 2005; Rajan & Zingales, 2003). Foreign investment and remittances from overseas workers are examples of financial inflows that can positively impact financial development. They can increase the availability of credit, investment opportunities, and access to financial services, thereby fostering growth in the financial sector. However, it is crucial to manage these inflows carefully, as they can also have negative consequences if not handled properly. Large capital inflows may lead to the "Dutch disease" consequence, causing currency appreciation and potential adverse consequences on exports and economic growth. Additionally, misdirected foreign investment can lead to asset bubbles and financial instability (UNCTAD, 2017).

One significant way in which financial inflows can promote financial development is through the development of financial markets, as foreign investment can enhance the liquidity and depth of financial markets, making it easier for businesses to access capital for growth (Olaniyi & Oladeji, 2021; George et al., 2021). However, the financial inflows impact on economic growth varies over recipient countries and relies on the financial inflows and economic practices in those countries (Aizenman et al 2013).

In the literature, scholars have presented varying perspectives on the interconnectedness between financial inflows and economic growth. Some argue that financial inflows can augment domestic savings and improve economic growth in developing countries (Bailliu, 2000; Aizenman et al., 2013). Conversely, others contend that financial inflows have a negative impact on economic growth (Ferreira & Laux, 2009; Murshid & Mody, 2011). Furthermore, discussions on the mediating role of financial development in the financial inflows-economic growth nexus have also taken place, using different measures of financial development indicators (Adeniyi et al., 2015; Olagbaju & Akinlo, 2018; Anetor, 2020).

Against above claimed, the present paper aims to explore the combined impact of various financial inflows on economic growth in Sub-Saharan Africa (SSA) by considering multiple financial development indexes rather than relying on a single measure of financial development as emphasized by Adeniyi et al., (2015); Olagbaju & Akinlo, (2018); Anetor, (2020). The study also takes cognizance of interconnectedness among financial inflows, financial development, and economic growth, considering the spillover consequences that globalization can bring to the financial system (Xu, 2020). The paper adopts the CS-ARDL methodology to analyze this interconnectedness in the presence of cross-sectional dependence among financial inflows, financial development and economic growth in SSA from 1990 to 2019. This method offers several key advantages in panel data analysis. It explicitly addresses cross-sectional dependence, a common issue in macroeconomic and financial data, by incorporating common correlated effects. This makes it more robust than traditional methods that assume cross-sectional independence. CS-ARDL provides flexibility in lag structure, allowing different lag lengths for different variables, which

better captures complex dynamic connections. It can be applied to variables with mixed orders of integration (I(0) or I(1)), eliminating the need for pre-testing for unit roots. Additionally, enables simultaneous estimation of both short-run and long-run associations, providing a more comprehensive understanding of variable dynamics. These features make CS-ARDL a versatile and powerful tool for analysing panel data with potential cross-sectional dependence and complex temporal nexus. Also, the choice of 1990s marked a watershed moment for financial sector development in Africa, with numerous countries implementing comprehensive reforms that reshaped their banking sectors and fostered capital market growth. This era of transformation aligned with an acceleration of global financial integration, creating a rich context for examining financial inflows to the continent. By concluding the study in 2019, gives room for nearly three decades of financial evolution and its association with economic growth, capturing both the immediate and long-term effects of these reforms. This endpoint also allows for a clear examination of pre-pandemic trends, establishing a valuable baseline unaffected by the exceptional economic disruptions brought about by the COVID-19 crisis, thus enabling more accurate insights into the structural dynamics at play during this pivotal period in sub-Saharan Africa economic development.

The rest of the study is order as follows: The next section provides a review of the relevant literature. Section 3 outlines the empirical methodology and data used in the study. Section 4 presents summary along with discussion of findings. Section 5 concludes with policy recommendations while section 6, finally subscribe to research limitations and future research.

2. Literature Review

Exploring the interconnectedness among financial inflows, financial development and economic growth. In the literature, various theory has been identified and discussed among which are: Endogenous Growth Theory, Financial Intermediation Theory, Financial Repression Theory, Dependency Theory and New Institutional Economics.

According to Endogenous Growth Theory, financial development and financial inflows play a crucial role in promoting long-term economic growth. Financial development enhances productivity by promoting technological innovation, entrepreneurship, and human capital accumulation. Financial inflows, particularly foreign direct investment, can contribute to economic growth by transferring technology, knowledge, and managerial expertise from developed to developing countries. Furthermore, financial intermediation theory suggests that financial development, such as the establishment of banks and other financial institutions, improves economic growth by facilitating the flow of funds from savers to borrowers. Financial inflows, such as foreign direct investment (FDI) and portfolio investments, can stimulate economic growth by providing additional financial resources for investment and production. However, financial repression theory suggests that excessive government control and regulation of the financial sector can hinder economic growth. Financial repression, which includes policies such as interest rate controls and directed credit programs, may discourage financial development and restrict financial inflows. These restrictions can impede efficient resource allocation and limit investment, thereby negatively affecting economic growth.

In addition, dependency theory argues that financial inflows, particularly foreign capital, can have both positive and negative consequences on economic growth, depending on the structure of the economy and the nature of the inflows. According to this perspective, developing countries may become dependent on foreign capital, which can lead to vulnerability and instability. Additionally, foreign financial inflows may be driven by the pursuit of short-term profits, leading to speculative bubbles and financial crises that can hinder long-term economic growth. Again, New Institutional Economics emphasizes the importance of institutions in shaping the relationship between financial development, financial inflows, and economic growth. Strong legal and regulatory frameworks, secure property rights, and consequence contract enforcement are considered essential for fostering financial development and attracting financial inflows. These institutions provide stability and confidence, encouraging investment and productive economic activities, which ultimately lead to economic growth.

Empirically, using data from 1988 and 2002, Choong et. al., (2010) investigated the consequences of three different private capital flows on economic growth using 51 recipient countries among developed and developing nations. Foreign direct investments (FDI) have an upsurge consequence on growth, while a negative nexus is obtained among foreign debt, portfolio investment and growth. As a result, capital inflows might not be as beneficial to economic growth as they once were.

Using the traditional neoclassical growth framework and an unbalanced panel dataset covering 1980 and 2005 for 18 Latin American countries, Fayissa and Nsiah (2010) investigated the impact of remittances on economic growth and its impact in comparison to other international financial flows: foreign assistance and foreign direct investment in Latin American countries. Their outcomes revealed a substantial consequence of remittances on Latin American countries' development, especially for underdeveloped financial systems, by providing an alternative source of financing investment and assisting in resolving liquidity constraints. In another study, Cooray (2012) used pooled OLS and system GMM estimation tools to investigate the migrant remittances consequence on the scale and productivity of the financial sector while considering 94 non-OECD economies. His findings revealed that remittances by migrants aid expansion of the financial sector's scale and productivity.

Using 100 countries data between 1990 and 2010, Aizenman, Jinjarak, and Park (2013) examined foreign capital inflows (such as FDI, portfolio investment, equity investment, and short-term debt) on growth. They further analyzed the relations among growth and capital flow lag (considering economic structure and global growth trends). They discovered a clear connection allying FDI (inflows and outflows) and economic development. Growth and equity flows have a minimum but less stable nexus, while growth and short-term debt had a zero prior nexus to the recession and a negatively correlated after that. Their findings suggested varying capital flows consequence during crisis and non-crisis periods.

Chee-Keong, Siew-Yong, and Zulkornain (2010) examined how foreign direct investment, portfolio investments, and foreign debt flows induced growth in developed and developing countries between 1988 and 2006. They analyzed their study using the generalized approach of moments (GMM). They found portfolio investment and foreign debt negatively impacted growth, while FDI had a beneficial impact, based on the GMM outcomes. Private capital flows promoted growth in low-income countries with a well-established financial sector while slowing growth in low-income countries with an

underdeveloped financial sector. As a result, healthy capital markets are essential to economic growth.

Kyriakos (2019) used GMM framework for a sample size of 78 countries from 1973 to 2013 and considered various financial capital flows and different banking regulation indicators to analyze the nexus between financial volatility and economic growth. Also, the study investigated the degree to which the nexus affected by regulatory rules. The study found that taking into account bank regulatory policies rules, disaggregated measures of net capital flows (FDI, equity and debt) reveal that the variations are beneficial to economic growth in the long run as against the short run. However, Swammy & Dharani (2020) employed data for G-7 economies with huge financial development levels spanning 1983 to 2013 and examine the dynamic nexus between financial development and economic growth. Their studies shows that domestic credit to the private sector and market capitalization were robust for the United States but insignificant among the Euro economies, suggesting excessive fund inhibited economic growth.

Considering studies from developing countries, Bailliu (2000) studied how capital inflows influenced the economic growth of 40 developing countries between 1975 and 1995 using a panel dataset. The estimates of the generalized method of moments (GMM) revealed that capital inflows promote economic growth independent of investment rates only in countries where the banking sector is well-developed. de Vita and Kyaw (2009) used the system GMM to assess the consequence of foreign direct investment, and portfolio investment flows on economic growth in 126 low, lower-middle, and upper-middle-income developing nations from 1985 to 2002. Their findings revealed that FDI had a beneficial impact on the economic growth of developed countries with lower- and upper-middle revenue levels but did not indicate any positive nexus in developing countries classified as low-income. Furthermore, portfolio flows in upper-middle-income countries have only had a beneficial influence on the economic growth of developing countries. Thus, only developing countries with low economic development and absorptive capacity would reap from the growth-improving consequence of investment flows.

Agbloyor et. al., (2014) used Generalized Method of Moments (GMM) estimator to analyze the association among private capital flows and economic growth in Africa from 1990 to 2007. Foreign direct investment, foreign equity fund investment, and private debt flow negatively affected economic development, especially in areas with strong domestic financial markets, which benefit the most from the ability to turn negative private capital flows into positive private capital flows. As a result, any country with poor financial markets could be more vulnerable to financial and exchange rate issues, leading to outflows of foreign capital and suppressing economic growth. Also, Adeniyi, Ajide and Salisu (2015) used an econometric panel method in selected Sub-Saharan Africa (SSA) countries to investigate how financial development influences the association between foreign direct investment (FDI) and economic growth. Their research looked at three varying financial development (FD) measures and their consequences on the FDI-growth relationship. They found that foreign direct investment has an upsurge consequence on economic growth, while inflation exhibits a negative impact, which is consistent with the macroeconomic volatility indicated by continuously rising domestic prices. Again, Olagbaju and Akinlo (2018) used panel data econometric methods to investigate financial development position as a means of absorptive ability in the FDI-economic growth nexus in selected Sub-Saharan African countries. Their findings revealed that the development of the financial system through the banking sector enhances FDI impact on regional economic growth.

Furthermore, Olayungbo and Quadri (2019) investigated the interconnectedness between remittances, financial development, and economic growth in SSA for twenty (20) nations between 2000 and 2015. The findings revealed that remittances and financial development were both short- and long-term drivers of economic progress

Amna and Riadh (2019) investigated financial flows' consequence on economic growth in developing countries for a global sample of 33 countries ranked by income level. The estimates from the Pooled Mean Group (PMG) confirmed the presence of a long-term nexus because the adjusted coefficient (error correction parameter) was negative. Foreign direct investment was found to hurt economic growth in the short term but not in the long run. Similarly, remittances had a short-term negative consequence on economic growth but not in the long run. Furthermore, the outcomes indicated that ODA has a negligible consequence on both short and long-term economic development.

Gnangnon (2020) examined three main external flows (aid, remittances, and FDI inflows) from 1970 to 2017, using a two-step GMM to examine trade access consequence on diversification of major external financial flows for development in 116 countries. Findings from the study revealed that trade openness was positively associated with financial flow diversification for growth. Similarly, Amna and Faouzi (2020) investigated financial flows consequence on economic growth. Specifically, they estimated financial flows using foreign direct investment, remittances and official development for 41 developing countries comprises of both low, lower and upper-middle income group. The GMM estimation technique was used and result revealed that, for low income countries the FDI consequence and remittances on economic growth are found to be positive. The official development assistance consequence on growth is also adverse. Similar to this, FDI has a negative consequence on economic growth in lower-middle-income countries, whereas remittances have a favourable consequence. On the other side, government development assistance has a small but detrimental consequence on growth. While government support and gross fixed capital formation have a notable and negative consequence on growth, FDI has a favourable consequence on economic growth for upper-middle-income nations. Adegboyega, Akinbobola and Ajayi (2021) investigated the extent to which trade liberalization influence the link between capital inflows (both private and public capital inflows) and economic growth; and their interactive nexus in Nigeria between 1985 and 2018. The result from Autoregressive Distributed Lag (ARDL) technique revealed the degree to which the variables had been co-integrated, as well as the use of both private and public equity inflows. In addition, the study reported that the error correction coefficient was negative and very high, indicating that long-term cointegration had been created.

The interconnectedness among financial inflows, financial development and economic growth have produced mixed outcome, even before and after the globalization era while diverse methodological analysis had been used among which are GMM, FMOLS, PMG among other which failed to consider the degree of interconnectedness among countries, which this present study intends to capture using CS-ARDL method of analysis, since it accommodate and address the plight of cross-sectional dependence and this method would also established whether long run and short run interconnectedness exist between financial inflows and economic growth in SSA.

3. Methodology

The present paper relies on the endogenous growth models framework of Romer's (1986; 1990) which was equally employed by Pagano (1993) that relied on the AK model and viewed as a linear function of total capital stock:

$$Yt = AtKt \qquad (1)$$

In order to determine the interconnectedness among financial inflows, financial development and economic growth equation (1) is expanded and becomes:

$$InGDPi,t = \varphi0 + \varphi1InGDPi,t−1 + \varphi2InREMi,t + \varphi3InGFCi,t + \varphi4InFDFi,t + \varphi5InFDIi,t+$$
$$\varphi6InFPIi,t + \varphi7InFDi,t + \varphi8POPi,t + \varphi9InTOi,t + \varphi10INSi,t + \varphi11EXCi,t + \mu i + \varepsilon i,t \qquad (2)$$

where: Gross Domestic Product (GDP) lagged coefficient is predicted to be negative ($\varphi1 < 0$).

Remittances may also affect the level of economic growth and this depends on how they are used ($\varphi2 >< 0$). Iqbal & Satter (2008); Vargas-Silva, Jha & Sugiyarto (2009) supported a positive relationship, while Barajas, Gapen, Chami, Montieland & Fullenkamp (2009) reported the existence of a negative nexus. Furthermore, the coefficients of $\varphi3$, $\varphi4$, $\varphi5$, $\varphi6$, $\varphi7$, $\varphi12 > 0$ suggesting that are predicted to be positive because they are growth-enhancing (Barro, 2000; Haider, Khan & Abdulahi 2016). Furthermore, the consequence of population growth cannot be predicted in a'priori ($\varphi8 >< 0$), as population growth may lead to new inventions and ideas, causing
GDP to rise faster. And, if population growth outpaces GDP (i.e., income per capita falls), this may harm economic growth (See Table 1). Sequel to the submission above, the Cross Section -ARDL model is:

$$\Delta yit = \mu i + \alpha i(yi,t−1 − i'xi,t−1 + \alpha i−1 \, i\bar{y}t + \alpha i−1 \, i'\bar{x}t) \, it \qquad (3)$$

Where: yit is the country i's dependent variable at time t
xit is a vector of explanatory variables
$\bar{y}t$ and $\bar{x}t$ are the cross-section averages of yi,t and xi,t

Equation 3 is therefore used to determine the cross-sectional correlation's long-run and short-run characteristics of financial inflows, financial development and economics growth in SSA.

In addition, ϕij and δij encapsulate the short-term dynamics allying variables, and αi indicates the pace of convergence to long-term equilibrium, θi, represents long-term equilibrium connection linking xit and yit. Meanwhile, the cointegrating interrelated between xit and yit is represented by the words in parenthesis, as the words in the parentheses only includes the level portions of cross-sectional averages in the long-term.

The CS-ARDL may be estimated by applying mean group (MG) and pooled mean group (PMG) estimators. The PMG estimator proposed by Pesaran et al. (1999) serves as an alternative approach since it is a middle procedure between the averaging and pooling techniques of estimation. Similar to the MG estimator, the PMG estimator permits the short-run coefficients, intercepts, error correction terms, and error variances to fluctuate

freely throughout the whole cross-section, but places a homogeneity restriction on the long-run coefficients. It worth noted that the PMG estimator cannot be used without fulfilling a number of conditions. A significant and negative error correction term coefficient can be used to confirm a long-term relationship between the variables of interest. Second, in order to support the weak exogenous treatment of the independent variables, the dynamic specification of the model must be substantially improved. Furthermore, error correction model of the residuals must be serially uncorrelated. Therefore, MG or PMG, should be applied depends on whether uniform slopes can be imposed for the expected long-term parameters.

As a result, consistency and efficiency are effectively compromised. If the long-term portions aren't identical across countries, the MG outcomes of the average are consistent but the PMG results are inconsistent. However, if the homogeneity limits are exact, cross-country estimators perform more efficiently than heterogeneous ones. As a result, when the long-run portions for particular nations are the same, both the MG and PMG results are consistent, but only the latter is efficient. The homogeneity assumption is supported by failure to reject the null, giving the PMG estimator has an edge over its MG equivalent. So, under the null (alternative) hypothesis, the PMG (MG) estimator is used. In reality, the PMG technique is frequently viewed as the best attainable compromise for consistency and efficiency assuming the homogeneity assumption is true. (Erülgen et al., 2020).

The main disadvantage of computing long-run coefficients from CS-ARDL specifications is that a relatively large time dimension is required for satisfactory small sample performance due to the inclusion of lagged dependent variables in the regressions, especially if the sum of the AR coefficients in the ARDL model is close to 1. According to Chudik et al. (2015), outlier estimates of the long-run repercussions for certain cross-section units may impact the behaviour of the CS-ARDL estimates of the long-run coefficients for the heterogeneous slope specification scenario. Chudik et al. (2015) established a novel technique for big heterogeneous panel data called cross-sectional augmented distributed lag (CS-DL) to estimate the long-run connection in the presence of cross-sectionally correlated errors. Because the distributed lag representation utilized in this method does not cover lags of the dependent variable, residual factor error structure as well as weak cross-section dependency of idiosyncratic mistakes are permitted.

Table 1 - Data description, measurement, and sources

Variables	Symbol	Description	Sources and Measurement
Economic Growth	GDP	Gross domestic product per capita	World Development Indicator US$ million
Foreign Portfolio Equity	FPI	This includes net inflows that cover transactions in equity securities and debt securities as a share of GDP.	IMF and World Bank, Global Development Finance/Index
Foreign Portfolio Debt flows	FDF	This is the sum of portfolio debt and other investment stock and shares as a ratio of GDP.	IMF and World Bank, Global Development Finance/Index

Foreign Direct Investment	FDI	FDI is calculated as a ratio of GDP	IMF and World Bank, Global Development Finance/Index
Remittances	REM	Remittances to GDP ratio	IMF and World Bank, Global Development Finance/Index
Gross Capital Formation	GFC	Gross capital formation to GDP ratio	OECD and World Bank/Index
Trade Openness	TO	Share of exports to GDP ratio	World Development Indicator Index
Population	POP	The growth rate of the labour force	World Development Indicators
Institution	INS	i. Control of corruption ii. Government consequenceiveness iii. Political stability iv. Rule of Law v. Regulatory Quality	The Worldwide Governance Indicators & International Country Risk Guide (ICRG)/Index
Exchange Rate	EXC	Nominal Exchange rate	World Bank National Accounts Data, and OECD National Accounts Data Files
Financial Development	FD	i. Domestic credit to the private sector ii. Liquid liabilities to GDP iii. Private credit as a percentage of GDP iv. Bank lending deposit spread	World Bank Global Development Finance/Index

Source: Author's Compilation

4. Results and Discussion

4.1 Preliminary Tests

In general, typical shocks across countries and regions are a relevant reason for the presence of cross-section dependence in any macroeconomic analysis (Mao & Shen, 2019), because ignoring typical shocks would result in an arbitrary correlation degree within and across economies in the context of globalization (Eberhardt & Teal, 2010). In addition, while assessing the effect of repressor variables on the regressor variable across different economies, the possibility of heterogeneity must be recognized.

As a result, before considering panel data regression estimates, it is preferable to study the cross-sectional dependency and slope heterogeneity characteristics among the nations in the SSA panel settings. According to Dong et al. (2018a and b) and Grossman & Krueger (1995), ignoring cross-sectional dependence and slope homogeneity would result in

inconsistent estimates and misrepresentations of outcomes, producing a big gap in policymaking.

Following the submission, Table 2 presents the outcomes of the slope homogeneity, in which the (delta) and (delta) adj. tests of Pesaran & Yamagata (2008) show that the outcomes of slope homogeneity were significant at the 5% significance level. However, for the robustness of the research study, the slope homogeneity test proposed by Blomquist & Westerlund (2013) as the adj. test was also significant at the 5% significance level, thereby confidently rejecting the null hypothesis of homogeneous slope coefficients. The heterogeneity of the slope portions hence leads to the determination of a long-run co-movement among the variables of the model for which various country groups were chosen

Table 2 − Slope homogeneity test

Tests	Stat. Value	p-value
Pesaran & Yamagata (2008): $\tilde{\Delta}$ (delta) test	3.519	0.000 *
$\tilde{\Delta}$ (delta) adj. test	4.596	0.000 *
Blomquist & Westerlund (2013): ΔHAC	6.028	0.000 *
(Δ_{HAC}) adj.	8.235	0.000 *

Source: Authors' Compilation.
Note: * $P < 0.01$, ** $P < 0.05$ respectively.
$\tilde{\Delta}$ (delta) test: simple slope homogeneity test;
$\tilde{\Delta}$ (delta) adj. test: mean variance biased adjusted slope homogeneity test;
Δ_{HAC}: heteroscedasticity and autocorrelation consistent version of simple slope homogeneity test;
(Δ_{HAC}) adj.: heteroscedasticity and autocorrelation consistent version of mean variance biased adjusted slope homogeneity test.

The existence of a long-run co-movement among the variables was demonstrated in Table 2 while this gives room to ran Cross Sectional Dependence (CSD) tests, and the purpose of this CSD test is to determine the ideal unit root test. However, various CSD tests identified in the existing literature include Breusch and Pagan's (1980) Lagrange multiplier (LM) test; Pesaran's (2004) scaled LM test; Pesaran's (2004) cross-section dependence test; and Baltagi et al. (2012) bias corrected scaled LM test, each with different conditions (Swamy & Dharani, 2020). Individual cross-sectional dependence (CSD) tests for fifteen SSA countries between 1990 and 2019 are shown in Table 3. This means that there is enough cross-sectional dependency across variables and panels. Furthermore, the findings contradict the null hypothesis, demonstrating that not only do the explanatory variables influence the economic growth variable in each nation, but so do the error terms in the regression among countries. It is suggested that when a shock occurs in one of these countries, it affects them all equally.

Table 4 responds to the above submission by presenting a second-generation panel unit root test that accounts for cross-sectional dependence, which is supported by the research of Swammy and Dharni (2020) and Hussain et al. (2021), who argued that in the presence of cross-sectional dependence, stationarity should be determined using a second-generation unit root test such as Pesaran's (2007) cross-sectional augmented IPS (CIPS) and cross-section augmented Dickey Fuller (CADF) unit root tests.

Table 3 - Cross sectional dependence test

Methods	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
Variable	Statistic	Statistic	Statistic	Statistic
GDP	2726.26**	179.849**	179.590**	52.004**
FDI	333.966**	14.765**	14.506**	8.9864**
PDF	1070.61**	65.598**	65.340**	11.343**
FPI	714.860**	41.049**	40.790**	14.950**
TO	2022.01**	131.251**	130.99**	41.811**
REM	578.191**	31.618**	31.359**	7.0003**
POP	1278.61**	79.951**	79.693**	5.834**
INS	812.369**	47.778**	47.519**	18.076**
GFC	571.539**	31.159**	30.900**	8.7206**
FD	727.688**	41.934**	41.675**	14.676**
EXC	1678.92**	107.576**	107.317**	37.370**

Note: ** $P < 0.05$, * $P < 0.10$ respectively.
Source: Authors Compilation.

Table 4 - Outcomes of second generation panel unit root tests

Methods	CIPS			CADF		
Variable	I(0)	I(1)	Integration order	I(0)	I(1)	Integration order
GDP	-1.233	-4.082**	I_1	-1.577	-3.193**	I_1
FDI	-3.028**	-5.340**	I_1	-2.769**	-4.537**	I_1
PDF	-0.843	-4.673**	I_1	-1.150	-3.150**	I_1
FPI	-2.141	-4.353**	I_1	-2.160***	-3.306**	I_1
TO	-2.203***	-5.252**	I_1	-2.060	-3.762**	I_1
REM	-2.609**	-5.373**	I_1	-2.236**	-3.843**	I_1
POP	0.151	-2.241**	I_1	-1.053	-1.793	$I_{(d)}$
INS	-2.715**	-5.369**	I_1	-2.625**	-4.787**	I_1
GFC	-2.588**	-5.100**	I_1	-2.413**	-4.336**	I_0
FD	-2.498**	-5.524**	I_1	-2.415**	-4.035**	I_1
EXC	-1.579	-4.175**	I_1	-1.923	-2.800**	I_1

Source: Authors Compilation.
Note: *** $P < 0.01$, ** $P < 0.05$ and $P < 0.1$ respectively.

The outcome of the unit root, for both CIPS and CADF unit root tests, with both intercept and time trends, had critical values for both tests of -2.45, -2.25, and -2.14 at 0.01, 0.05, and 0.1 levels of significance, respectively. The outcome revealed the unit root of order one I(1), especially Pesaran's (2007) cross-sectional augmented IPS. Again, three different panel co-integration techniques were employed, among which are the Pedroni (1999, 2004) and Kao (1999) cointegration tests and the Westerlund (2008) bootstrap panel co-integration test. The result of the test is shown in Table 4, affirming that the three co-integrating tests were statistically significant at the 5% level of significance, rejecting the null hypothesis of no co-integration. Hence, there is a co-integrating association among the variables of interest.

4.2   **Discussion of Finding**

Column 1 of Table 5 presents the estimated findings of the models on the impact of financial inflows and financial development on economic growth in the country without the inclusion of control variables such as the exchange rate and population. Column 2 displays the results of the growth model, which incorporate all variables of relevance as justified by theory. The estimation of the economic growth model in column 1 shows a positive but negligible association between foreign direct investment and economic growth, with a 0.003 percent rise in foreign direct investment due to economic growth. This shows that increased foreign direct investment tends to boost economic growth. This finding challenges the conventional wisdom that FDI is a key driver of economic growth. Policymakers may need to reassess strategies focused on attracting FDI and instead focus on the quality and sector-specificity of foreign investments rather than just the quantity. It may be necessary to implement complementary policies to help realize the potential benefits of FDI.

Similarly, the portfolio equity investment (FPI) coefficient has a negative and insignificant relationship with economic growth, with a 0.021 percent decrease in foreign portfolio equity investment attributable to economic growth, contradicting the theoretical proposition's prior expectation. Like FDI, the lack of significant impact from FPI suggests that policymakers should be cautious about relying too heavily on portfolio investments to drive economic growth. It may be more beneficial to focus on developing domestic financial markets and improving the overall investment climate as the discovery supports the findings of Anetor's (2020). Remittances show a positive and statistically significant effect on economic growth in both model variations. The coefficients (0.031) indicate that a 1% increase in remittances is associated with a 0.031% increase in GDP, ceteris paribus (P 0.01, t = 1.89). This is in line with the study conducted by Fayissa and Nsiah (2010); Olayungbo and Quadri (2019). This shows that in SSA countries remittances appear to play a crucial role in driving long-term economic growth. This suggests that policies facilitating remittance inflows, reducing transfer costs, and promoting the productive use of remittances could significantly contribute to economic development. Countries may benefit from creating channels to better leverage remittances for investment and development projects.

Furthermore, the foreign debt inflows (FDF) coefficient is positive and statistically significant in terms of its link with economic growth, with a 1% increase in FDF translating into a 0.079% increase in economic growth (P < 0.05, t = 3.18). The outcome contradicts the results observed by Chee-Keong et al (2010) and Choong et al (2010). This indicates that foreign debt, when managed properly, can contribute to long-term economic growth.

However, policymakers must ensure that borrowed funds are invested in productive sectors that enhance long-term growth potential rather than being used for short-term consumption. Sustainable debt management policies are crucial to harness the positive effects while avoiding debt crises. The gross fixed capital formation (GFC) coefficient is positive and statistically significant at 5 percent, with 1 percent increase in capital resulting into about 0.001 percent increase in economic growth ($P < 0.05$, $t = 2.36$). The outcome contravenes the results documented by Amna and Faouzi (2020), as this underscores the importance of domestic investment in driving long-term economic growth. Policies that encourage capital formation, improve the business environment, and facilitate access to finance for domestic firms could significantly contribute to sustainable economic development.

In addition, trade balance coefficient positively influences economic growth and was found to be statistically significant at 5 percent significance level, with I percent rise in trade balance resulting to 0.228 increase in economic growth ($P < 0.05$, $t = 3.68$). This is however conformed with the submission of Gnangnon (2020). The positive association highlights the crucial role of international trade in fostering economic growth and policies promoting trade liberalization, reducing trade barriers, and improving trade infrastructure could significantly boost long-term economic performance. However, policymakers should also consider measures to help domestic industries adapt to increased international competition. Another prominent determinant of growth in the literature is institutional quality and the institutional quality (INS) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a 1 percent increase in institutional quality translating into about a 0.048 percent increase in economic growth in the economy ($P < 0.01$, $t = 1.70$). This suggests that good institutions may contribute to long-term economic growth, albeit with some uncertainty. Efforts to improve governance, reduce corruption, and enhance the rule of law could have positive long-term effects on economic performance. However, the mixed results imply that institutional improvements should be part of a broader development strategy rather than being seen as a standalone solution. Although financial development index (FD) is positive but insignificant with economic growth, with 0.398 percent increase in financial development attributable to economic growth. This implies that well developed financial development is needed to increase economic growth in the economy. The outcome is supported by the remarks by Swammy and Dharani (2020)

The value of the coefficient of gross fixed capital creation (GFC) is positive and statistically significant at 5%, with a 1% increase in capital resulting in a 0.001% rise in economic growth (P < 0.05, t = 2.36). The outcome contradicts the results observed by Amna and Faourzi (2020). However, the positive association underscores the crucial role of domestic investment in driving both immediate and long-term economic growth. This suggests that policies encouraging capital formation and improving the investment climate could be highly beneficial for sustained economic development in SSA. Furthermore, the trade balance coefficient was found to be statistically significant at the 5% significance level, with a 1% increase in trade balance leading to a 0.228 increase in economic growth (P < 0.05, t = 3.68). The outcome is supported by the study undertaken by Gnangnon (2020). The positive impact emphasizes the importance of international trade for economic growth. The economic implication is that policies promoting trade liberalization and international economic integration could significantly contribute to both immediate and long-term economic growth. Another prominent determinant of growth in the literature is

institutional quality, and the institutional quality (INS) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a one-percentage-point increase in institutional quality translating into about a 0.048-percentage-point increase in economic growth (P < 0.01, t = 1.70). This suggests that while good institutions may contribute to long-term economic growth, their impact is not immediate and may be subtle. The implication is that improving institutional quality should be viewed as a long-term strategy for economic development, rather than a quick fix for immediate growth challenges.

However, the result from column 2 was a bit different for which all variables of interest were used in the analysis. Table 5, column 2 reveals that the remittances coefficient is beneficial and statistically significant in terms of its nexus with economic growth, with a 1 percent improvement in remittances (REM) translating into about 0.786 percent increase in economic growth ($P < 0.05$, $t = 2.26$). This, however, aligned with the study undertaken by Fayissa and Nsiah (2010)

Also, the foreign debt inflows (FDF) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a 1 percent rise in foreign debt inflows translating into about 0.362 percent rise in economic growth in the economy ($P < 0.05$, $t = 4.78$). The finding corroborates the study examined by Anetor (2020). Both remittances and foreign debt inflows show positive and significant effects on economic growth in the long run. This finding implies that these international financial flows contribute substantially to economic development. Remittances likely provide additional income to households, potentially boosting consumption and investment. Foreign debt, when used productively, can finance crucial development projects and infrastructure, leading to long-term growth.

Table 5 - Long run outcome on the interconnectedness among financial inflows, Financial Development and Economic Growth using Dynamic CS-ARDL

Independent Variable	Dependent Variable: GDP (Economic Growth)		Dependent Variable: GDP (Economic Growth)	
	Coefficient	t-stat	Coefficient	t-stat
FDI	0.003	0.85	-0.003	-0.09
REM	0.031*	1.89	0.786**	2.26
PDF	0.079**	3.18	0.362**	4.78
FPI	-0.021	-0.28	0.163	0.37
GFC	0.001**	2.36	0.036**	3.54
TO	0.228**	3.68	0.413**	3.29
FD	0.398	0.68	2.903**	3.41
INS	0.048*	1.7	-0.312	-0.99
POP			-0.026	-0.48
EXC			0.005	1.56
Observation	435		420	
F-stat & Prob	3.47 (0.000)		8.35 (0.000)	
CD stat &Prob	-0.66 (0.509)		-2.18 (0.029)	

Source: Authors Compilation.
Note: ** (*) represents 5% (10%) significant level.

The gross fixed capital formation (GFC) coefficient is beneficial and statistically significant at 5 percent, with a 1 percent increase in capital resulting in about 0.0.036 percent increase in economic growth ($P < 0.05$, $t = 3.54$). In addition, trade balance coefficient positively influences economic growth and was found to be statistically significant at a 5 percent significance level, with a I percent rise in trade balance resulting in a 0.413 increase in economic growth ($P < 0.05$, $t = 3.29$). This is in line with the study investigated by Ho et al (2021) and Gnangnon (2020) affirming how gross fixed capital formation influences economic growth. Furthermore, the financial development index (FD) is found to be beneficial and statistically significant at 5 percent, with a 1 percent increase in financial development resulting in about 2.903 percent increase in economic growth ($P < 0.05$, $t = 3.41$). This suggests that well-developed financial development tends to increase economic growth in the economy. This means that the financial system in the sub-region of SSA facilitates and improves resource allocation to improve investment and growth. Hence, this corroborates findings conducted by Adeniyi et. al., (2015) and Olayungbo and Quadri (2019). Contrary to the outcome in column 1, the institutional quality (INS) coefficient is negative and statistically not significant to economic growth, with a 1 percent decrease in institutional quality translating into about 0.312 percent reduction in economic growth in the economy, even human capital development proxied by population growth is negative and statistically insignificant. However, the coefficient of the exchange rate is positive but statistically insignificant under the studied era. foreign direct investment has an inverse and insignificant nexus with economic growth, as against what happens in column 1. This suggests that higher foreign direct investment tends to reduce economic growth in the economy. And that the coefficient of portfolio equity investment (FPI) has a positive and insignificant relationship with economic growth, with a 0.163 percent decrease in foreign portfolio equity investment attributable to economic growth. Again, foreign direct investment and portfolio equity investment were found not to be significant.

table 6 - short run outcome on the connection between financial inflows and economic growth using dynamic CS-ARDL

Independent Variable	Dependent Variable: GDP (Economic Growth		Dependent Variable: GDP (Economic Growth)	
	Coefficient	t-stat	Coefficient	t-stat
GDP(-1)	0.457**	5.18	0.634**	8.24
FDI	0	0.36	0	0.24
REM	0.020**	2.52	-0.033	-1.14
PDF	0.024	0.86	0.025	1.06
FPI	-0.019	-0.51	-0.013	-1.14
GFC	0.002**	2.71	0.003	1.36
TO	0.068**	2.66	0.13**	3.95
FD	0.357	1.45	-0.11	-0.38
INS	0.017	1.58	-0.012	-0.84
POP			-0.026	-0.48
EXC			0.005	1.56
ECM(-1)	-0.542**	-6.14	-0.365**	-4.76

Source: Authors Compilation.
Note: ** (*) represents 5% (10%) significant level.

Furthermore, Table 6 presents short-run outcomes on the interconnectedness among financial inflows, financial development, and economic growth. As documented for the long-run analysis, so also column 1 of Table 6 contains the outcomes from the estimation of the models without the involvement of control variables like exchange rate and population. Column 2 provides results from the growth model that includes all variables of interest.

As presented in Table 6, the error correction term coefficient in columns 1 and 2 are negative and statistically significant at 5 a percent significant level. This demonstrates the short-run interconnection of the model, which shows that the short-run change velocities are 0.542 percent and 0.365 percent. Also, a relatively short transition period has led to relatively little change, and even in cases where there have been imbalances, the return to equilibrium has been relatively rapid, with 54.2% and 36.5% occurring in the first year. Given these findings, it is imperative that for the financial inflows and financial development to have any consequence on economic growth in SSA, policymakers need to come up with much better policies that are aimed at addressing economic growth level through the activities of the financial inflows, in solving the economic plight affecting the country.

These findings have several important economic implications. First, they highlight the potential benefits of policies that facilitate remittance inflows and manage foreign debt effectively. Second, they underscore the crucial role of domestic investment and trade openness in driving both short and long-term economic growth, suggesting that policies promoting capital formation and trade liberalization could be beneficial. Third, the results indicate that financial sector development may have long-term benefits, even if short-term impacts are not evident. Fourth, the lack of significant impact from FDI and FPI suggests that policymakers should carefully evaluate the effectiveness of policies aimed at attracting these forms of investment. Finally, the presence of error correction in the short-run model implies that economies have a tendency to return to their long-run equilibrium, but the speed of adjustment may vary. Overall, these findings provide valuable insights for developing economic strategies aimed at promoting sustainable long-term growth.

5.   Summary of findings and conclusion

The advent of globalization has reveals an interconnectedness among countries, as no nations or countries are independent of her own. In view of this, present study investigates if there is any interconnectedness among financial inflows, financial development and economic growth in selected sub-Saharan Africa countries between 1990 and 2019. The study employed and tested for cross sectional dependency (CSD), Second generation unit root test of CIPS and CADF, along with cointegration test of Kao, Pedroni and Westerlund to affirm that there is a co-integrating association among the variables. Again, cross section autoregressive distributed lag was used to affirm that there is both long run and short run interconnectedness among financial inflows, financial development and economic growth in the selected SSA countries.

The results of the CS-ARDL reveals that financial development positive influence economic growth in the long run while not in the short run. In addition, the coefficient of remittances and foreign debt inflows positively and statistically enhanced economic growth in the selected SSA countries. However, the consequence of foreign direct investment and foreign portfolio investment were found to be positively/negatively influence economic

growth and not significant. Again, the consequence of trade openness and gross fixed capital formation were found to be positive and statistically significant. By and large, the coefficient of the ECM is inversely related and reveals that the short-run change velocities are 0.542 percent and 0.365 percent respectively.

Therefore, we submit that financial inflows, financial development, and economic growth are interrelated, although not all the financial inflows contribute as expected to the growth of the selected countries in SSA, hence the policymakers and government should do more to ensure policy(ies) that would attract more foreign direct investment into the region as a consequence of foreign direct investment could assist in wealth creation as against foreign debt that requires debt servicing and remittances that sent home mostly altruism reasons. The implications of these findings are far-reaching for policymakers in Sub-Saharan Africa. They further suggest a need for a demanding approach to economic development that goes beyond simply attracting foreign investment. Instead, policies should focus on creating an environment that maximizes the benefits of remittances, manages foreign debt effectively, promotes domestic investment, and fosters international trade. Additionally, the development of robust financial sectors and improvement of institutional quality should be prioritized as part of long-term growth strategies.

References

1. Adegboyega, S. B., Akinbobola, T. O., & Ajayi, F. O. (2021). Capital Flows and Economic Growth: What Role Does Trade Liberialisation Play? *Izvestyia Journal of University of Economics-Varna*, Bulgaria 65(1), 26-44; doi: 10.36997/IJUEV2021.65.1.26
2. Adeniyi O, Ajide, B., & Salisu A (2015). Foreign Capital Flows, Financial Development and Growth in Sub-Saharan Africa. *Journal of Economic Development*. 40(3), 85 - 103
3. Agbloyor, E. K., Abor, J. Y., Adjasi, C. K. D., & Yawson, A. (2014). Private Capital Flows and Economic Growth in Africa: The Role of Domestic Financial Markets. *Journal of International Financial Markets, Institutions and Money*, 30, 137-152.
4. Aizenman, J., Jinjarak, Y., & Park, D. (2013). Capital Flows and Economic Growth in the Era of Financial Integration and Crisis, 1990–2010. *Open Economies Review*, 24(3), 371-396.
5. Amna Z., & Riadh E. (2019). Short-Term and Long-Term Consequences of Financial Flows on Economic Growth. *Journal of Economic Integration*, 34(4):705-724.
6. Amna Z., & Faouzi S. (2020). Impact of foreign direct investment, remittances and official development assistance on economic growth: panel data approach, *PSU Research Review*. 2399-1747 doi 10.1108/PRR-04-2020-0012
7. Anetor, F. (2020). Financial development threshold, private capital inflows and economic growth: Evidence from sub-Saharan African countries, *International Journal of Development Issue*, 19(1), 77-92, doi 10.1108/IJDI-06-2019-0099.
8. Bailliu, N.J. (2000). Private Capital Inflows, Financial Development and Economic Growth in Developing Countries, *Working paper* 2000-15, Bank of Canada.
9. Barajas, A., M.T. Gapen, R. Chami, P. Montieland & Fullenkamp, C. (2009). Do workers remittances promote economic growth? *IMF Working Paper* WP/09/153. Washington, DC: IMF: 1-22

10. Barro, R.J. (2000). Inequality and growth in panel countries. *Journal of Economic Growth*, 5,5-32.

11. Cheng, Y., & Yao, X. (2021). Carbon intensity reduction assessment of renewable energy technology innovation in China: A panel data model with cross-section dependence and slope heterogeneity, *Renewable and Sustainable Energy Reviews* 135 (2021) 110157

12. Chudik, A., K. Mohaddes, M. H. Pesaran, and M. Raissi (2015). Long-Run E§ects in Large Heterogeneous Panel Data Models with Cross-Sectionally Correlated Errors. Federal Bank of Dallas, Globalization and Monetary Policy Institute Working Paper No. 223.

13. Chee-Keong C., Siew-Yong L., & Zulkornain Y. (2010). Private capital flows to low-income:The role of domestic financial sector. *Journal of Business Economics and Management,*11(4): 598–612.

14. Choong, C., Baharumshah, A. Z., Yusop, Z., & Habibullah, M. S. (2010). Private capital flows, stock market and economic growth in developed and developing countries: A comparative analysis, *Japan and the World Economy* 22:107-117.

15. Cooray, A. (2012). Migrant remittances, financial sector development and the government ownership of banks: Evidence from a group of non-OECD economies. *Journal of International Financial Markets, Institutions and Money*. 22(4). 936-957 https://doi.org/10.1016/j.intfin.2012.05.006.

16. De Vita, G.K. & Kyaw, S. (2009). Growth Consequences of FDI and Portfolio Investment Flows to Developing Countries: A Disaggregated Analysis by Income Levels", *Applied Economic Letters,* 16(3), 277-283.

17. Eberhardt M, Teal F. (2010). Productivity analysis in global manufacturing production. *Economics series working papers* 515. University of Oxford

18. 18. Erülgen, Ahmet; Rjoub, Husam; Adalıer, Ahmet (2020) : Bank characteristics effect on capital structure: Evidence from PMG and CS-ARDL, *Journal of Risk and Financial Management*, MDPI, Basel, 13(12), 1-13, https://doi.org/10.3390/jrfm13120310

19. Fayissa, B., & Nsiah, C. (2010). The Impact of Remittances on Economic Growth and Development in Africa. *The American Economist*, *55*(2), 92–103. https://doi.org/10.1177/056943451005500210

20. Ferreira, M. A., & Laux P. A. (2009). Portfolio flows, volatility and growth. *Journal of International Money and Finance*, 28. 271-292

21. George, E.O, Aberu, F, & Adegboyega, S.B. (2021). Institutional quality, Investors Objectives and FDI inflow in African Regions. *Acta Universitatis Danubius Œconomica*, 17(3), 193 – 208.

22. Gnangnon, S.K. (2020). Trade Openness and Diversification of External Financial Flows for Development: An Empirical Analysis. *South Asian Journal of Macroeconomics and Public Finance*, 9(1), 22–57

23. Grossman, G.M., & Krueger, A. B. (1995). Economic Growth and the Environment. *The Quarterly Journal of Economics*, 110(2):353-377.

24. Haider, M.A., Khan, M.A., & Abdulahi, E. (2016). Determinants of Foreign Portfolio Investment and Its Consequences on China. *International Journal of Economics and Finance*. 8(12). doi:10.5539/ijef.v8n12p143.

25. Iqbal, Z. and A. Satter, (2008). The contribution of workers remittance to economic growth in Pakistan. *Pakistani Institute of Development Economics, Research Report No*. 187, 1-25.

26. Kyriakos, C.N (2019). Volatile capital flows and economic growth: The role of banking supervision. *Journal of Financial Stability* . 40: 77-93.
27. Levine, R. (2005). Finance and growth: theory and evidence. *Handbook of Economic Growth*, 1, 865-934.
28. Lucas R. (1988). On the mechanics of economic development, *Journal of Monetary Economics*, 22:33-42
29. Murshid, A.P. & Mody, A. (2011). *Growth from international capital flows: The role of volatility regimes.* International Monetary Fund
30. Olaniyi, C. O., & Oladeji, S. I. (2021). Moderating the effect of institutional quality on the finance–growth nexus: Insights from West African countries. *Economic Change and Restructuring*. https://doi.org/10.1007/s10644-020-09275-8.
31. Olagbaju, I. O. & Akinlo, A. E. (2018). FDI and Economic Growth Relationship in Sub Saharan Africa: Is the domestic financial system a significant intermediator? *Archives of Business Research*, 6(5), 90-112.
32. Olayungbo, D.O., & Quadri, A. (2019). Remittances, financial development and economic growth in sub Saharan African countries: evidence from a PMGARDL approach. *Financial Innovation*, 5(9), 1-25. https://doi.org/10.1186/s40854-019-0122-8.
33. Pagano, M. (1993). Financial markets and growth An verview.*European Economic Review* 37, 613 - 622. North-Holland.
34. Pesaran, M. H., Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, *94*(446), 621–634. https://doi.org/10.1080/01621459.1999.10474156.
35. Pesaran, M. H., Shin, Y., & Smith, R. P. (2006). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, *94*(446), 621. https://doi.org/10.2307/2670182
36. Pesaran, M. Hashem, Aman Ullah & Takashi Yamagata. (2008). A bias adjusted LM test of error cross-section independence. *Econometrics Journal* 11: 105–27.
37. Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, *68*(1), 79–113. https://doi.org/10.1016/0304-4076(94)01644-F
38. Pesaran, M. H., L. V. Smith, & T. Yamagata. (2013). Panel unit root tests in the presence of a multifactor error structure. *Journal of Econometrics* 175: 94–115.
39. Pesaran, M. H., & Yamagata, T. (2008). Testing slope homogeneity in large panels, *Journal of Econometrics*, 142,50-93.
40. Romer P.M. (1990), Endogenous Technological Change, *Journal of Political Economy*, 98 (5)
41. Swamy V & Dharani M. (2020). Thresholds in finance–growth nexus: Evidence from G-7 economies. *Aust Econ Pap*. 2020;e12192. https://doi.org/10. 1111/1467-8454.12192
42. United Nations Conference on Trade and Development (UNCTAD) (2017). World Investment Report 2017: Investment and the Digital Economy. United Nations.
43. Vargas-Silva, C., S. Jha & Sugiyarto, G. (2009). Remittances in Asia: Implications for the fight against poverty and the pursuit of economic growth. *ADB Working Paper Series*, No.182
44. WDI (2021). *World Development Indicators 2021*, World Bank Publications.

45. Xu, Z. (2020). Economic policy uncertainty, cost of capital and corporate innovation. *Journal of Banking & Finance*, 111, Article 105698.

FACTORS INFLUENCING INDONESIAN CONSUMERS' PURCHASE INTENTION OF ECO-LABELED CANNED TUNA

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Abstract

Ecolabelling for wild-caught seafood, including Dolphin-Safe and MSC, has become more important as environmental issues increase. This study investigates the factors influencing Indonesian consumers' purchase intentions for eco-labeled canned tuna, focusing on consumer trust, behavioral intentions, perceived effectiveness, subjective norms, price, knowledge, and attitudes. Utilizing the Fuzzy AHP method, the study prioritizes these factors to understand their impact on purchasing decisions. The findings reveal that perceived consumer effectiveness, attitudes, and trust are the most significant drivers of purchasing intentions for eco-labeled canned tuna. Conversely, consumer knowledge had a relatively low impact, highlighting a critical gap in consumer education regarding environmental issues and ecolabelling. While consumer knowledge had a relatively low impact, this finding highlights a critical gap in consumer education regarding environmental issues and ecolabelling. To address this gap, enhancing consumer awareness and education about ecolabels could increase the acceptance and purchase of eco-labeled products. The results offer valuable guidance for policymakers and stakeholders aiming to improve eco-labeling initiatives and align them with consumer preferences, ultimately supporting sustainable consumption practices.

Keywords: Consumer Behavior, Ecolabelling, Eco-labeled Canned Tuna, Fuzzy AHP.

1. Introduction

Sustainable consumption practices are needed in the fishing industry due to environmental concerns. For example, an estimated 650,000 marine mammals are caught or seriously

injured in fisheries annually, including 300,000 whales and dolphins (Smith et al., 2014). Moreover, overfishing in the industry has led to the exploitation of migrant fishermen as companies aim to reduce costs (Greenpeace, 2020). As a solution, eco-label certifications have been developed for fishery products to enable consumers to make informed decisions.

Ecolabels such as Dolphin-Safe and Marine Stewardship Council (MSC) have been introduced to promote sustainable fishing practices and address issues of fish exploitation and labor. The Dolphin-Safe label guarantees that the product has not been associated with any dolphin chase, netting, or killing, while the MSC label certifies that the seafood producer adheres to sustainable fishing standards. Since 2000, there has been a significant increase in the use of ecolabels in the industry, with over 50 labels varying in standards, assessment levels, and focus (Asgha and Cook, 2022). These labels have different focuses, such as sustainability, responsible fishing practices, organic, and fairness.

In Indonesia, awareness on ecolabels is limited, reflected in the scarce availability of eco-labeled products (Pradipta, 2018). Many consumers are unfamiliar with labels such as Dolphin-Safe and MSC, and only a small percentage can recognize them (Asgha & Cook, 2022). However, there is a growing interest in sustainable living and green consumerism among Indonesians, with increasing willingness to pay a premium for eco-friendly products (IBCSD, 2021; Tan, 2022). The price difference between eco-labeled products and non-eco-labeled ones ranges from 6,000 to 10,000 IDR.

The importance of adopting sustainable products is highlighted by Sheoran and Kumar (2020), who suggest that such practices can drive sustainable economic growth and contribute to a more sustainable future. Indonesia, a major player in the global tuna fishing industry, contributes significantly to the processed tuna export market, alongside countries like Thailand, the Philippines, and Vietnam (Greenpeace, 2020). National fish consumption has also seen a positive trend from 2015 to 2022 (Indonesian Statistics Center, 2023).

This study aims to address the following research questions: What is the level of awareness among Indonesian consumers regarding canned tuna products with ecolabels? What factors influence their willingness to purchase these products? And how do these factors impact their overall behavior towards eco-labeled canned tuna? By focusing on consumer behavior towards eco-labeled canned tuna, this research seeks to understand the impact of recent ecolabel introductions in the Indonesian market and their accessibility to consumers. This research specifically targets consumer behavior towards canned tuna products, as ecolabelling has recently been introduced in the Indonesian market and these products are readily accessible to consumers.

2. Literature Review

Several papers and articles have been conducted to examine the impact of various factors on consumer buying behavior. A comprehensive review of multiple articles and papers has facilitated the identification of the determinants of consumer purchasing decisions.

2.1 Trust

Consumer confidence in the environmental performance of green products is a crucial factor (Arora et al., 2021). Previous studies have revealed that consumers take the time to read label information before making purchasing decisions (Galati et al., 2021). Ecolabels

have been found to enhance consumer confidence in the products they choose to consume (Brécard et al., 2009), while certification labels can help reduce information asymmetry and create value (Mulazzani et al., 2021). A lack of trust in eco-friendly products can significantly reduce the intention to buy them.

2.2 Behavioral Intention

The factor of behavioral intention is affected by attitudes and subjective norms. According to the theory of planned behavior, consumer attitudes and subjective norms are key elements in determining behavioral intentions (Ajzen, 1991). Previous studies have found that people with a higher altruistic value orientation are more concerned about the environment and are more likely to engage in pro-environmental behavior (Galati et al., 2021; Mulazzani et al., 2021). Additionally, better-informed consumers tend to request seafood with ecolabeling when making purchases (Salladarré et al., 2010).

2.3 Perceived Consumer Effectiveness

According to Webster in Arora et al. (2021), one important factor in assessing consumers is determining how much their consumption choices can contribute to solving problems on a larger scale. Consumers who are mindful of their environmental and social impact actively seek information about product attributes and are willing to pay more for eco-friendly options (Doran, 2009). Previous studies have found that consumers' perceived effectiveness plays a role in their decision to purchase green products (Sheoran & Kumar, 2020; Galati et al., 2021; Asgha & Cook, 2022). However, Song et al. (2019) point out that not all intentions and preferences for ecolabels translate into actual behavior.

2.4 Subjective Norms

The term "subjective norms" refers to an individual's perception of social pressures that may encourage or discourage them from engaging in a particular behavior based on the opinions of individuals or reference groups that they consider important (Ajzen, 1991). These norms can influence not only purchasing decisions but also other factors that impact the intention to buy environmentally friendly products (Arora et al., 2021). Various cultural, personal, and social factors can also play a role in consumer decision-making (Kotler & Keller, 2016). Research has shown that an individual's social circle can influence their product choices; for instance, if family and friends do not use eco-friendly products, the individual may be less likely to do so as well. Additionally, some consumers may avoid sustainable products for fear that it will not improve their social status in society (Sheoran & Kumar, 2020).

2.5 Price

This factor is the most frequently considered factor in previous studies. High prices emerge as one of the most critical barriers to sustainable consumer behavior (Sheoran & Kumar, 2020). Consumers consider prices when buying products to maximize satisfaction (Rubinfeld and Pindyck, 2013). Previous studies show that environmentally conscious consumers are willing to pay a premium for green products (Mulazzani et al. 2021; Liu et al., 2017; Brécard et al., 2009). However, Cremer & Thisse (1999) found that consumers vary in their willingness to pay high prices for environmentally friendly products, even

when they prefer those products. Anugerah (2022) discovered that eco-labeled products tend to be more expensive than conventional products, and consumers' lack of awareness about their importance is a significant reason why they prefer conventional products. On the other hand, research also shows that the price level does not always impact consumers' purchasing decisions for eco-labeled canned tuna (Asgha & Cook, 2022).

2.6 Knowledge

Consumers' high knowledge of green products leads to stronger beliefs in their positive impact (Arora et al., 2021). Previous studies support the idea that consumer knowledge positively affects the intention and decision to purchase environmentally friendly products (Galati et al., 2021; Sheoran & Kumar, 2020; Salladarré et al., 2010; Brécard et al., 2009). While Arora et al. (2021) and Song et al. (2019) present opposing views. Liu et al. (2017) found that even consumers with relatively low knowledge of ecolabel production standards still hold positive attitudes towards ecolabel products due to their perceived health and environmental benefits. Meanwhile, Rahman (2019) utilized the theory of planned behavior and knowledge variables to examine how effective ecolabels are in attracting consumer interest in packaged drinks. The findings indicate a notable positive correlation between knowledge and consumer attitudes, as well as subjective norms and behavioral intentions (Rahman, 2019).

2.7 Attitude

This factor is identified as the individual ability to assess the costs and benefits of certain actions (Ajzen, 1991). Previous studies have shown that consumers are more likely to choose products with ecolabels because they offer environmental benefits (Liu et al., 2017). Consumers who value sustainability and believe that eco-friendly products protect the environment and workers are more likely to consider ecolabels (Galati et al., 2021). Additionally, these consumers are willing to pay more for products with ecolabels, as shown by studies conducted by Liu et al. (2017) and Brécard et al. (2009).

3. Methodology

This study used a structured questionnaire to gather data, focusing on Indonesian residents aged 17 and above who had purchased canned tuna at least once. A purposive sampling approach was employed, with an initial target of 230 respondents based on The Rule of Thumb method (Arora et al., 2021). The study successfully collected responses from 243 participants, with a composition of 77.4% female and 22.6% male, primarily in the 18-24 (65.8%) and 25-34 (24.7%) age groups. Table 1 summarizes the sample profile.

The questionnaire consisted of closed-ended questions divided into two sections: Part A for demographic information and Part B for 23 statements related to seven criteria. Responses were rated on a five-point Likert scale, and internal consistency was confirmed with a Cronbach's Alpha of 0.9. Criteria and sub-criteria were ranked based on average scores, with barriers selected if the mean score was above 3 (Sheoran & Kumar, 2020). The hierarchical structure and pairwise comparison matrix were developed using relevant literature and expert opinions. While purposive sampling was used to ensure relevant responses, it may limit the representativeness of the sample for the broader Indonesian population.

Table 1 – Sample Profile

Characteristics	Percentages
Gender	
Males	22.6
Females	77.4
Education Level	
Elementary School	0.4
Junior High School	0.4
Senior High School	41.6
Diploma	13.6
Bachelor's Degree	41.9
Master's Degree	2.1
Monthly Income	
Less than 1 million IDR	28.8
1-4.99 million IDR	46.9
5-9.99 million IDR	18.9
10-14.99 million IDR	3.3
More than 15 million IDR	2.1
Age	
Between 18-24 years	65.8
Between 25-34 years	24.7
Between 35-44 years	4.9
Between 45-54 years	3.7
55 years or more	0.8

Source: Authors' analysis

3.1 Fuzzy Analytical Hierarchical Process

To analyze the obtained data, the Fuzzy Analytic Hierarchy method is used. This method aims to consider subjective perceptions in decision-making by assigning weight to criteria. Fuzzy set theory is the most commonly used method for addressing uncertainty in multicriteria decision analysis (Demirel et al., 2008). The Fuzzy AHP method is able to handle the complexity of intrinsic ambiguity in AHP. Human experience and judgment are often represented in linguistic forms and patterns that are not clear in more complex systems. Data that can be quantified provides a better description of research (Elveny and Syah, 2014). Previous research used Fuzzy AHP in various areas such as comparing barriers to sustainable consumer behavior (Sheoran & Kumar, 2020) and factors influencing consumer purchase intentions towards organic food (Arora et al., 2021).

The following are the steps of Chang's Extent analysis for Fuzzy AHP (Chang, 1996).

3.1.1 Hierarchical Structure

The hierarchy arrangement is formed based on the factors to be studied. Hierarchy is a visualization of complex problems into a structure where the highest level is the goal, followed by criteria and sub-criteria. Simplifying the problem into these elements will make it easier for decision-makers to analyze problems and draw conclusions from problems.

3.1.2 Pairwise Comparison Matrix

The matrix is arranged based on the level of importance of each criterion based on the AHP scale. This matrix describes how much influence each element has on other elements. The description of the interest intensity of the AHP scale can be seen in Table 2.

3.1.3 The Consistency Index

Consistency testing is carried out to ensure that the assessment of elements in the pairwise comparison matrix can be considered logical. Here below is the equation to get the CI value.

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

After obtaining the CI value, the CR value can be obtained (CR $= \frac{CI}{RI}$). The matrix is consistent if the CR value is $\leq 10\%$.

3.1.4 Triangular Fuzzy Numbers (TFN)

Fuzzy AHP is presented by determining the degree of triangular membership function and TFN (Chang, 1996). The TFN number is a fuzzy set theory used to measure aspects related to human subjective judgment using linguistic forms. Pairwise comparisons are represented on a Fuzzy scale. Previous research has used Fuzzy AHP in various fields, such as comparing barriers to sustainable consumer behavior (Sheoran & Kumar, 2020) and factors influencing consumer purchase intentions for organic food (Arora et al., 2021).

In determining the TFN scale, the membership function $\mu_M(x): R \rightarrow [0,1]$ is equal to:

$$\mu_M(x) = \begin{cases} \dfrac{x}{m-l} - \dfrac{l}{m-l}, & x \in [l, m] \\ \dfrac{x}{m-u} - \dfrac{u}{m-u}, & x \in [m, u] \\ 0, \end{cases}$$

Where $l \leq m \leq u$, l and u are the lower and upper values of the middle value.

If element j is more critical than element i, then the pairwise comparison scale can be represented by fuzzy numbers.

$$a_{ij}^{-1} = (\frac{1}{u}, \frac{1}{m}, \frac{1}{l})$$

Table 2 – TFN Scale

AHP Scale	Linguistic Scale	TFN	Reciprocal
1	Just Equal	(1,1,1)	(1,1,1)
2	Intermediate	(1/2, 1, 3/2)	(2/3, 1, 2)
3	Moderately Important	(1, 3/2, 2)	(1/2, 2/3, 1)
4	Intermediate	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)
5	Strongly Important	(2, 5/2, 3)	(1/3, 2/5, 1/2)
6	Intermediate	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)
7	Very Strong	(3, 7/2, 4)	(1/4, 2/7, 1/3)
8	Intermediate	(7/2, 4, 9/2)	(2/9, 1/4, 2/7)
9	Extremely Strong	(4, 9/2, 9,2)	(2/9, 2/9, 1/4)

Source: Chang (1996)

3.1.5 Fuzzy Synthesis Value

Fuzzy synthesis (S_i) values from pairwise comparisons are obtained by dividing the total values of l, m, u per row by the total values of l, m, u per column. Here are the functions.

$$S_i = \sum_{j=1}^{m} M_{g_i}^j \odot \left[\sum_{i=l}^{n} \sum_{j=1}^{m} M_{g_i}^j \right]^{-1}$$

Where $M_{g_i}^j$ is the value of i object level analysis for the value m.

3.1.6 Priority Vector

The vector for each criterion is obtained through a comparison of fuzzy numbers. To compare M_j and M_i, the $V(M_j \geq M_i)$ and $V(M_i \geq M_j)$ values must be found first.

$$V(M_j \geq M_i) = \begin{cases} 1, & if\ m_j \geq m_i \\ 0, & if\ l_i \geq u_j \\ \dfrac{l_i - u_j}{(m_j - u_j) - (m_i - l_i)}, & others \end{cases}$$

3.1.7 Defuzzification Ordinal Value

The ordinate defuzzification value can be obtained after obtaining the value of each defuzzification factor. The value taken is the minimum value of the factors in each element.

$$= V[(M \geq M_1), (M \geq M_2), \dots, (M \geq M_k)]$$
$$= min\ V[(M \geq M_i) \quad i = 1,2,\dots,k$$

Where $V(M \geq M_1, M_2, \ldots, M_k)$ is $M_i(i = 1,2,.., k)$.

Therefore, $d'(A_i) = minV(S_i \geq S_k)$ with $k = 1,2,\ldots,n; k \neq 1$.

3.1.8 Normalization of Fuzzy Vector Weights

Vector weights are normalized by dividing the defuzzification factor by the total defuzzification value. This stage is carried out on each selected element. The fuzzy vector weights are defined as:

$$W = (d'(A_1), d'(A_2), \ldots, d'(A_n))^T$$

Where $A_i(i = 1,2,\ldots,n)$ is n element.

The normalized value of vector weights can be obtained by

$$W = (d(A_1), d(A_2), \ldots, d(A_n))^T$$

Where W is a non-fuzzy number.

3.1.9 Priority Results Ranking

The calculation results are sorted from the highest value. Decisions are taken from the largest results indicating that the element is the highest priority.

4. Results and Discussion

4.1 Results on the Measures Used

The weights for each criterion and sub-criteria are obtained through Fuzzy AHP calculations with the same steps as when determining the local weights of the main criteria. While the global weight is calculated by multiplying the value of the local weight of the main criteria with the local weight of the sub-criteria (Sheoran & Kumar, 2020). Table 3 is the result of calculations using Fuzzy AHP.

Based on the results, perceived consumer effectiveness is the criterion with the largest local importance with 0.042, followed by attitudes (0.252), trust (0.227), price (0.075), behavioral intention (0.022), subjective norms (0.02), and knowledge (0.002). In contrast, price and trust were found to be the most important factors in a similar study (Arora et al., 2021). Consumers who support ecolabelling policies pay more attention to price when buying fish (Brécard et al., 2009). Indonesian consumers' intention to buy eco-labeled canned tuna products is relatively low, and their desire to purchase eco-labeled canned tuna products is not fully driven by social pressure. The low weight of consumer knowledge indicates the need to improve consumer education on environmental issues and ecolabelling. Similar results were found in Arora et al. (2021), who found that consumer knowledge is ranked the lowest among other factors.

Table 3 – Fuzzy AHP Calculations Results

Criteria/Sub-criteria	Criteria's Local Importance		Sub-Criteria's Local Importance		Sub-Criteria's Global Importance	
	Weights	Ranking	Weights	Ranking	Weights	Ranking
Trust (A)	**0.227**	**3**				
I believe in ecolabelling of food products. (A1)			0.292	3	0.066	7
I always read the label information on food products before purchasing. (A2)			0.024	4	0.006	17
I believe that canned tuna products with ecolabels, such as Dolphin-Safe and MSC, have gone through a certification process that prioritizes sustainability. (A3)			0.314	2	0.071	6
I trust shopping places that sell eco-labeled canned tuna. (A4)			0.370	1	0.084	4
Behavioral Intention (B)	**0.022**	**5**				
I tend to buy eco-labeled canned tuna if I see it on display. (B1)			0.684	1	0.015	12
I often visit stores to buy eco-labeled canned tuna. (B2)			0.316	2	0.007	13
Perceived Consumer Effectiveness (C)	**0.402**	**1**				
Eco-labeled canned tuna products can have a positive effect on the environment and society. (C1)			0.443	2	0.178	2
I want to buy eco-labeled canned tuna in the hope that I can make an impact on environmental conservation. (C2)			0.046	3	0.018	10
Purchasing eco-labeled canned tuna can make a meaningful difference in environmental conservation. (C3)			0.511	1	0.205	1
Subjective Norms (D)	**0.020**	**6**				
The people around me, such as my family and close friends, play a role in my decision to buy canned tuna products. (D1)			0.214	3	0.004	18
I want to buy eco-labeled canned tuna because of the positive improvement in social image that I perceive after purchase/use. (D2)			0.316	2	0.006	16
I want to buy eco-labeled canned tuna because my family/friends use the product and encourage me to do so. (D3)			0.129	4	0.003	19
I want to buy canned tuna with ecolabels because I have enough awareness about ecolabels. (D4)			0.341	1	0.007	15
Price (E)	**0.075**	**4**				
The price of eco-labeled canned tuna is in line with the quality offered. (E1)			0.398	1	0.030	8
Price plays an important role in purchasing decisions. (E2)			0.245	3	0.018	11
I am willing to pay a premium price for eco-labeled canned tuna products. (E3)			0.090	4	0.007	14
I wanted to buy canned, eco-labeled tuna that was similar in price to regular products. (E4)			0.267	2	0.020	9

Knowledge (F)	0.002	7				
Reading news or articles gives me a good knowledge of eco-labeled food products. (F1)			0.645	1	0.001	20
I am used to products that come in environmentally safe packaging. (F2)			0.332	2	0.001	21
I can recognize brands and symbols of canned tuna products that are environmentally friendly. (F3)			0.017	3	0.00003	22
I can easily identify the eco-labeled canned tuna. (F4)			0.005	4	0.00001	23
Attitude (G)	0.252	2				
Purchasing eco-labeled canned tuna will give me a positive feeling about contributing to environmental improvement. (G1)			0.684	1	0.173	3
Purchasing eco-labeled canned tuna will give me a positive feeling about contributing to the protection of the labor involved in the production process. (G2)			0.316	2	0.080	5

Source: Authors' analysis

In global weights, it can be seen that ecolabelling plays a significant role in building trust among Indonesian consumers when it comes to food products and stores that sell eco-labeled canned tuna. However, there seems to be a lack of interest in reading label information and a tendency to avoid paying premium prices, despite holding strong altruistic values. As a result, consumers are more inclined to purchase eco-labeled canned tuna if it is priced the same as non-eco-labeled products. They have a greater willingness to buy eco-labeled canned tuna products at a price similar to regular products than their willingness to pay a premium price. A more detailed explanation regarding each factor will be explained in Section 4.2.

4.2 Discussion

The results indicate that consumers exhibit a high level of trust in shopping places offering eco-labeled canned tuna products, with Dolphin-Safe and MSC ecolabels also being significant. Supermarkets are the preferred retail choice for purchasing canned tuna. This underscores the importance of ecolabels in shaping consumer beliefs and purchasing habits. Ecolabels enhance consumer confidence, particularly among the 18-34 age group, who demonstrate greater environmental awareness (Brecard et al., 2009). This observation aligns with Salladarré et al. (2010) and Tan (2022), who emphasize the role of ecolabels in consumer trust. However, the relatively low importance assigned to reading label information contrasts with findings from Galati et al. (2021), which suggest that consumers often spend time analyzing label information. Instead, consumers prioritize product attributes such as price and packaging over label information (Song et al., 2019). This discrepancy suggests that while trust in ecolabels is high, actual label-reading behavior may not be as prevalent, indicating a potential area for further research and consumer education.

Consumers show little interest in buying eco-labeled products. Many consumers are unaware of environmentally friendly products, which can lead to perceptions of them as costly or inconvenient to obtain. Limited availability in certain regions further exacerbates this issue (Paço et al., 2013). The WWF-Indonesia and Nielsen Survey (2017) revealed that

53% of consumers struggled to find eco-friendly products locally (IBCSD, 2021). This finding supports Salladarre et al. (2010), who found that information access influences the likelihood of seeking out eco-labeled seafood. Despite the impact of attitudes and subjective norms on behavioral intentions (Ajzen & Fishbein, 1980), these factors alone do not always translate into actual purchasing behavior (Kotler & Keller, 2016). This implies that increasing consumer awareness and product availability could be crucial in enhancing the practical impact of pro-environmental intentions.

Perceived consumer effectiveness is a crucial factor influencing both local and global rankings. Consumers' perceptions of eco-labeled canned tuna impact their purchase intentions, primarily due to concerns about environmental preservation (Liu et al., 2017). Nonetheless, the perceived impact of individual efforts on environmental change remains low, which hinders the adoption of green products (Sheoran & Kumar, 2020). This aligns with Galati et al. (2021), who noted that consumers with altruistic attitudes towards sustainable food are more inclined to consider ecolabels. However, there is a gap between intention and action, suggesting that while awareness of environmental issues is present, it may not always translate into purchasing decisions (Song et al., 2019). Policymakers and marketers could address this by enhancing the perceived impact of individual actions through educational campaigns and clearer communication of environmental benefits.

The influence of subjective norms on consumer purchasing intentions appears limited. Consumers may undervalue others' opinions or consider them irrelevant in their decision-making process (Ajzen, 1991). This finding contrasts with Sheoran and Kumar (2020), who found that subjective norms do influence purchasing decisions. While family and friends do play a role in influencing consumer choices, their impact on the intention to purchase eco-labeled canned tuna is relatively low. Chan (2001) suggests that subjective norms are more influential when consumers have high environmental concern. Kotler and Keller (2016) also note that situational factors and others' attitudes can affect purchase intentions. This implies that increasing social awareness and peer influence related to eco-friendly products could enhance their market penetration.

Price remains a significant factor in consumer decision-making regarding eco-friendly products. Some consumers are willing to pay a premium for higher environmental quality (Salladarré et al., 2010), while others prioritize cost over ethical considerations (Arora et al., 2021). Indonesian consumers are willing to pay more for eco-labeled products, but high prices can be a barrier (Tan, 2022; Sheoran & Kumar, 2020). Brécard et al. (2009) and Rubinfeld & Pindyck (2013) suggest that consumers are more likely to pay higher prices if they perceive greater benefits. This underscores the need for balancing environmental benefits with affordability to enhance sustainable consumer behavior.

Knowledge about ecolabels has the smallest influence on purchasing intentions among Indonesian consumers. Ranked last among seven criteria, this indicates relatively low awareness of ecolabels. Consumer education and exposure to green products positively affect perception and reduce information asymmetry (Galati et al., 2021). Publications and socialization are crucial for raising awareness (Kotler & Keller, 2016). Although consumers may be aware of environmental issues, they might not recognize ecolabels in their daily lives (Song et al., 2019). Sheoran and Kumar (2020) support that increased awareness is essential for improving acceptance of green products. Efforts to enhance consumer education and increase visibility of ecolabels could significantly impact purchasing behavior.

Attitude significantly influences consumer buying intentions, second only to perceived consumer effectiveness. Consumers see eco-labeled products as having a lower negative environmental impact and higher quality (Brécard et al., 2009). Those with positive attitudes towards these products see them as beneficial to the environment, society, and their own health (Chan, 2001). Liu et al. (2017) note that ecolabels enhance consumer utility, and those with altruistic values are more likely to consider ecolabels and accept higher prices (Galati et al., 2021). This suggests that fostering positive attitudes towards eco-labeled products and emphasizing their benefits could enhance market acceptance and consumer willingness to pay.

For policymakers, marketers, and stakeholders, the findings suggest several key actions to enhance the effectiveness of eco-labeling initiatives and promote sustainable consumer behavior. Firstly, there should be a concerted effort to enhance consumer education about the benefits and availability of eco-labeled products, which will help bridge the knowledge gap and improve purchase intentions. Improving product availability is also crucial, as addressing the limited distribution of green products in various regions will make them more accessible to consumers. Additionally, strategies should be developed to balance the cost of eco-labeled products with consumer willingness to pay, potentially through subsidies or incentives. Leveraging positive consumer attitudes towards eco-friendly products by emphasizing their environmental benefits and quality can further support these initiatives. Integrating these insights with existing literature and focusing on practical applications can significantly aid stakeholders in fostering sustainable consumer behavior.

5. Conclusions

This study aims to identify the various factors that may influence the consumer purchase intentions of eco-labeled canned tuna products, as canned tuna is the most demanded product among all other tuna products in both the national and global markets and the adoption of greener lifestyles and green consumerism behavior has started to occur in society. Various factors that play an important role or act as determinants in the purchase of eco-labeled seafood products have been considered in previous literature. Factors are determined based on a literature review and the scale has been adjusted by the Fuzzy AHP method, which is then implemented to obtain results. This study has 243 respondents as samples. This study found that perceived consumer effectiveness, attitudes, and beliefs are the three main factors that influence purchasing intentions. The low weight of consumer knowledge indicates the need to improve consumer education on environmental issues and ecolabelling. The relative weights of the various factors in this study are expected to provide benefits for policy makers and other related parties, and can be expected to help in efforts to improve criteria with low priority weights.

6. Study Contribution and Implication

6.1 Sustainable Consumer Education Program

Develop and launch an extensive education campaign on the importance of environmental issues, the positive impact of purchasing eco-labeled products, and the long-term benefits to society and the environment. This education should be organized in an attractive and

easy-to-understand manner to make consumers aware of the positive impacts of purchasing eco-labeled products.

6.2 Tax Incentives or Subsidies for Eco-Labeled Products

Consider providing tax incentives or subsidies to producers and consumers involved in the purchase and production of eco-labeled products. This can help reduce the price difference between sustainable products and conventional products, thus making them more affordable for consumers.

6.3 Partnerships with Retailers and The Food Industry

Develop partnerships with retailers and the food industry to promote eco-labeled canned tuna products more actively. This could include setting up special displays in stores, special promotions, or even loyalty programs for consumers who choose sustainable products.

6.4. Future Limitations and Scope

The study has several limitations that should be addressed in future research to enhance its credibility and comprehensiveness. One limitation is the narrow scope of research factors considered. Future studies could benefit from incorporating interviews, more in-depth literature reviews, and additional surveys to explore a wider range of factors influencing consumer behavior regarding eco-labeled products. Key factors such as product image, social clusters, income level, and perceived personal relevance were not extensively examined and could provide valuable insights into consumer preferences.

Furthermore, expanding the scope of research to include diverse consumer populations across different regions of Indonesia could offer a more representative view of consumer behavior. Incorporating cross-country studies could also provide a broader perspective on global consumer preferences and trends. Addressing these limitations through a more expansive and diverse research approach would contribute to a more nuanced understanding of the factors driving consumer behavior towards eco-labeled products.

References

1. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T
2. Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice Hall.
3. Arora, A., Rani, N., Devi, C., & Gupta, S. (2021). Factors affecting consumer purchase intentions of organic food through fuzzy AHP. *International Journal of Quality & Reliability Management, 39*(5), 1085–1103. https://doi.org/10.1108/IJQRM-08-2020-0292
4. Asgha, B., & Cook, J. (2022). Consumer preferences and willingness to pay for canned tuna ecolabels in Indonesia: A study in DKI Jakarta. *Journal of Cleaner Production.*
5. Brécard, D., Hlaimi, B., Lucas, S., Perraudeau, Y., & Salladarré, F. (2009). Determinants of demand for green products: An application to eco-label demand for

fish in Europe. *Ecological Economics, 69*(1), 115–125. https://doi.org/10.1016/j.ecolecon.2008.06.007

6. Chan, R. Y. (2001). Determinants of Chinese consumers' green purchase behavior. *Psychology & Marketing, 18*(4), 389–413. https://doi.org/10.1002/mar.10078

7. Chang, D. Y. (1996). Applications of the extent analysis method on fuzzy AHP. *European Journal of Operational Research, 95*(3), 649–655. https://doi.org/10.1016/0377-2217(96)00021-6

8. Cremer, H., & Thisse, J.-F. (1999). On the taxation of polluting products in a differentiated industry. *European Economic Review, 43*(3), 575–594. https://doi.org/10.1016/S0014-2921(98)00072-5

9. Demirel, T., Demirel, N. Ç., & Kahraman, C. (2008). Fuzzy analytic hierarchy process and its application. In *Fuzzy multi-criteria decision making: Theory and applications with recent developments* (pp. 53–83). Springer. https://doi.org/10.1007/978-0-387-77779-7_3

10. Ditjen PDSPKP. (2019). *Peluang usaha dan investasi tuna.* Kementerian Kelautan dan Perikanan (KKP).

11. Elveny, M., & Syah, R. (2014). Analisis metode fuzzy analytic hierarchy process (FAHP) dalam menentukan posisi jabatan. *TECHSI-Jurnal Teknik Informatika, 6*(1).

12. Galati, A., Miret-Pastor, L., Siggia, D., Crescimanno, M., & Fiore, M. (2021). Determinants affecting consumers' attention to fish eco-labels in purchase decisions: A cross-country study. *British Food Journal, 124*(10), 2993–3013. https://doi.org/10.1108/BFJ-01-2021-0031

13. Greenpeace. (2020). *Southeast Asia canned tuna ranking.* Retrieved from https://www.greenpeace.org/indonesia/press-release/2020/02/11/ranking-tuna/

14. Kotler, P., & Keller, K. L. (2016). *Marketing management* (15th ed.). Pearson.

15. Mulazzani, L., Piredda, L., Cerjak, M., & Camanzi, L. (2021). Consumer appreciation of a shark-free eco-label for small pelagics. *British Food Journal, 123*(13), 88–104. https://doi.org/10.1108/BFJ-03-2020-0218

16. Nazir, M. (2003). *Metode penelitian.* Ghalia Indonesia.

17. Do Paço, A., Alves, H., Shiel, C., & Filho, W. L. (2013). Development of a green consumer behavior model. *International Journal of Consumer Studies, 37*(4), 414–421. https://doi.org/10.1111/ijcs.12019

18. Food and Agriculture Organization. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action.* FAO.

19. Pradipta, T. (2018). Ecolabel product in Indonesia; is it working? *The Palm Scribe.* Retrieved from https://thepalmscribe.id/ecolabel-product-in-indonesia-is-it-working/

20. Rahman, M. D. F. (2019, August). Analisis eco-label terhadap minat beli konsumen pada minuman kemasan. In *Prosiding Industrial Research Workshop and National Seminar* (Vol. 10, No. 1, pp. 927–937).

21. Rubinfeld, D. L., & Pindyck, R. S. (2013). *Microeconomics* (8th ed.). Pearson.

22. Salladarré, F., Guillotreau, P., Perraudeau, Y., & Monfort, M.-C. (2010). The demand for seafood eco-labels in France. *Journal of Agricultural & Food Industrial Organization, 8*(1). https://doi.org/10.2202/1542-0485.1067

23. Sheoran, M., & Kumar, D. (2020). Benchmarking the barriers of sustainable consumer behavior. *Social Responsibility Journal, 18*(1), 19–42. https://doi.org/10.1108/SAMPJ-10-2018-0366

24. Smith, Z. A., Gilroy, M., Eisenson, M., Schnettler, E., & Stefanski, S. (2014). *Net loss: The killing of marine mammals in foreign fisheries.* National Resources Defense Council.

25. Song, L., Lim, Y., Chang, P., Guo, Y., Zhang, M., Wang, X., Yu, X., Lehto, M. R., & Cai, H. (2019, May). Ecolabel's role in informing sustainable consumption: A naturalistic decision-making study using eye-tracking glasses. *Journal of Cleaner Production, 218,* 685–695. https://doi.org/10.1016/j.jclepro.2019.01.214

26. Teisl, M. F., Roe, B., & Hicks, R. L. (2002). Can eco-labels tune a market? Evidence from dolphin-safe labeling. *Journal of Environmental Economics and Management, 43*(3), 339–359. https://doi.org/10.1016/S0095-0696(01)00030-8

27. Thrane, M., Ziegler, F., & Sonesson, U. (2009). Eco-labelling of wild-caught seafood products. *Journal of Cleaner Production, 17*(3), 416–423. https://doi.org/10.1016/j.jclepro.2008.06.006

THE ROLE OF PRODUCT - SERVICE DESIGN AND STRATEGIC PLANNING IN PREDICTING COMPETITIVE ADVANTAGE

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Abstract

To gain and maintain competitive advantage in the 21st century, organisations must effectively understand and respond to customer needs. This study examines how strategic planning mediates the relationship between product-service design and competitive advantage through the lens of the Resource-Based View (RBV). The RBV framework suggests that the use of internal resources and capabilities, such as strategic planning processes, can enhance an organisation's competitive position. Jamovi software was used to test the fit, reliability and validity of the model through regression analysis, factor analysis and principal component analysis. The study used a stratified random sample of 200 managers from the Tanzania-Zambia Railway Authority (TAZARA). Data were collected using a five-point Likert scale questionnaire and analysed using descriptive statistics, regression analysis, factor analysis and principal component analysis. The results reveal a positive and significant relationship between product-service design and competitive advantage, and between strategic planning and competitive advantage. In particular, strategic planning was found to partially mediate the relationship between product-service design and competitive advantage. This study makes a unique contribution to the existing literature by demonstrating that strategic planning is a critical mediator that enhances the impact of product-service design on competitive advantage. It highlights the importance for organisations to effectively formulate and implement strategic planning in order to sustain competitive advantage. Future research should replicate this study in other industries and explore additional moderating and mediating variables to provide more comprehensive insights.

Keywords: Product - service design; Strategic planning; Competitive advantage; Mediation.

1. Introduction

Businesses around the world are trying to come up with fresh and inventive approaches to attract more customers and improve their financial success. As the success of any organisation depends on its customers, managers in organisations are working hard to understand and determine their customers' desires (Tryson, 2022) in order to meet the demands and maintain the competitiveness of their organisations in this tense, dynamic competitive environment. When it comes to doing the right thing and ensuring that what is promised is delivered, managers should ensure a high level of reliability in the promises made to consumers to ensure their satisfaction (Oyeniyi & Abiodun, 2012). To stay ahead of the competition and survive in today's volatile and dynamic environment, firms need to differentiate themselves from other competitors (Yangailo, 2023a). According to Sharp (1991), the future belongs to those who take a long-term view of market conditions by deciding what they want to do and what they are best placed to do, and then stick to their decision by concentrating on achieving excellence in serving their chosen market position. Product/service design is the most important thing to consider when developing a new product or service. Designs are created with the customer's wants and needs, existing products and market competition in mind. Managers now recognise the value of customer satisfaction in attracting and retaining more customers.

Although empirical studies show a positive relationship between product-service design and competitive advantage, few include a contingency variable as a moderator or mediator to provide more comprehensive insights into this relationship (Brissaud et al., 2022; Teixeira et al., 2012; Mukhtar et al., 2012; Polaine et al., 2013; Martinez et al., 2010; Baird et al., 2011). To fill this gap, the present study was conducted to further explore this relationship by including 'strategic planning' as a contingency variable.

Despite the established positive relationship between product-service design and competitive advantage, there is limited empirical research that includes strategic planning as a contingency variable to provide a more complete understanding of this relationship. This gap in the literature suggests the need to explore how strategic planning mediates the relationship between product-service design and competitive advantage in order to provide deeper insights for organisations seeking to improve their competitive positioning.

By including strategic planning as a mediating variable, the study provides a more nuanced understanding of the dynamics between product-service design and competitive advantage. This can help organisations identify the critical factors that contribute to sustainable competitive advantage.

2. Literature Review

In today's dynamic business environment, characterised by rapid technological advances, increased competition and changing customer expectations, companies must adopt innovative strategies to maintain a sustainable competitive advantage. One such strategy is Product-Service Design (PSD), which represents a significant departure from traditional product-centric approaches by integrating tangible products with complementary services to enhance market positioning. This literature review aims to provide a comprehensive examination of the interplay between PSD, strategic planning and competitive advantage. This section examines the theoretical frameworks that underpin these concepts, analyses

recent empirical studies and identifies existing gaps in the literature that this study seeks to fill.

2.1 Theoretical Framework

The Resource-Based View (RBV) is a key theoretical framework for understanding the dynamics between PSD, strategic planning and competitive advantage. The RBV posits that a firm's sustainable competitive advantage derives from its unique combination of tangible and intangible resources. These resources, characterised by heterogeneity and imperfect mobility, create barriers to imitation and enable firms to achieve superior performance (Madhani, 2010). Recent advances in RBV theory highlight the importance of cross-functional capabilities and strategic alignment in explaining why some firms outperform others (Chatterjee et al., 2023). However, the RBV literature often lacks a detailed exploration of how PSD specifically contributes to leveraging these resources for competitive advantage.

2.2 Competitive Advantage

Competitive advantage is defined as the ability of an organisation to carry out its activities in a way that is different from its rival competitors (Kotler, 2000). "Competitive advantage allows a firm to consistently outperform its competitors and generate significant profits from a large portion of its market" (Yangailo, 2023b). Achieving "true" customer loyalty is necessary in the current context of intense competition; moreover, gaining customers' trust and commitment is a crucial step towards long-term customer loyalty (Vasquez-Parraga & Sahagun, 2014). The competitive advantage capabilities that differentiate a firm from its competitors are quality and cost/price (Tracey et al., 1999). This highlights a gap in understanding how PSD contributes to developing and sustaining these competitive advantages in contemporary markets.

2.3 Product Service Design

Furrer (1997) defines the product-service idea as "proposing a mix of tangible products and intangible services that are designed and combined to optimise product use and performance". Motivation, ideas for improvement, organisational skills and forecasting are all part of the design process. Innovation, research and development are critical components of the manufacturing process. Because of the impact that product and service design can have on an organisation, the design process is encouraged to be a component of the organisation's strategy. Forecasting, organisational skills, suggestions for improvement and motivation are all part of the design process (Yangailo, 2024a). Product Service Design is a new approach to responsible industrial innovation (Peruzzini et al., 2014). Despite the growing recognition of the strategic importance of PSD, there is still limited research on how its integration into business strategy directly influences competitive advantage and organisational performance.

2.4 Strategic Planning

Strategic planning is a method that assists an organisation in determining its destiny and purpose (Barry, 1997). "Strategic planning helps organisations to know what to do, why to do it and how to do it" (Yangailo, 2024b, p. 48). Strategic planning is the process of

validating and directing entrepreneurial efforts by evaluating both current and future goals (Henderson & Hines, 2019). Strategic planning helps organisations determine what to do, why to do it, and how to do it. The selection of goals that shape the company's strategy is influenced by strategic planning (Yangailo, 2022). However, the literature also indicates inconsistencies in how strategic planning affects competitive advantage, suggesting a need for more nuanced research in this area (Yangailo, 2022).

2.5 Product - Service Design and Competitive Advantage

Service design thinking can help rethink value propositions to include solutions that meet customer needs while maintaining competitive advantage (Rau et al., 2017). It has also emerged as a competitive tactic to force producers to offer a comprehensive range of products and services (Geng et al., 2010). Constant development is a key criterion in the global retail industry, with a focus on continuous benchmarking with competitors (Brondoni et al., 2013). Ferdousi et al. (2018) examined the relationships between organisational characteristics, TQM and competitive advantage. The results show that the extent to which TQM practices, including product-service design, were adopted was positively associated with competitive advantage. Despite this, there is a need to further explore how PSD interacts with other strategic factors to enhance competitive positioning in different industry contexts.

It is clear that product-service design and competitive advantage are inextricably linked, as evidenced by previous studies (Brissaud et al., 2022; Teixeira et al., 2012; Mukhtar et al., 2012; Polaine et al., 2013; Martinez et al., 2010; Baird et al., 2011). The existence of the positive relationship between product-service design and competitive advantage based on previous studies is undeniable, therefore, this study adopts the following hypothesis:

> Hypothesis 1: *Product-service design has a positive significant impact on competitive advantage.*

2.6 Product service design and Strategic Planning

Several studies have demonstrated and presented that strategic planning is a process that leads to the creation and implementation of product-service systems (Mitake et al., 2020), and the positive substantive relationship between them is undeniable. The relationship between strategic planning and PSD is well documented, but further studies are needed to explore how this relationship evolves and affects competitive outcomes in different sectors (Kurpiela, 2022; An et al., 2008). This suggests a gap in understanding how strategic planning frameworks can be effectively integrated with PSD processes to achieve sustainable competitive advantage. As a result of the importance of strategic planning in PSD, the following hypothesis has been developed:

> Hypothesis 2: *Product-service design has a positive significant relationship with strategic planning.*

2.7 Strategic Planning and Competitive Advantage

Mulyaningsih et al. (2021) aimed to assess the influence of SP on the competitive advantage of Indonesian small and medium-sized enterprises (SMEs). The results of the

study show that SP has a significant impact on competitive advantage. Kiiyo (2019) conducted a study in Kenya on the influence of organisational structure and employee behaviour on the relationship between SP and competitive advantage in manufacturing firms. According to the results of the study, SP has a significant impact on competitive advantage.

Miller et al (2004) conducted a study of 55 companies in the UK to learn about tactics for successful implementation of strategic decisions. The results suggested that meticulous managerial planning does not ensure effective outcomes in a firm. Powell (1992), after examining the relationship between planning and performance from a resource perspective, found that SP did not meet the criteria for long-term competitive advantage.

There is a need for further research into the nature of the relationship between strategic planning and competitive advantage. This discrepancy highlights the need for further research into the specific conditions under which strategic planning effectively contributes to competitive advantage (Yangailo, 2024c). The literature on the impact of SP on competitive advantage is inconclusive. As a result, the following hypothesis was selected for the purposes of this research study:

Hypothesis 3: *Strategic planning has a positive significant impact on competitive advantage.*

This literature review reveals a complex interplay between PSD, strategic planning and competitive advantage. While the existing research provides valuable insights, several gaps remain, particularly regarding how PSD and strategic planning together influence competitive advantage in contemporary business environments. Addressing these gaps will improve our understanding of how organisations can use PSD and strategic planning to achieve and sustain competitive success.

2.8 Conceptual Framework

The following hypothesized model was built based on the association between the variables used in this study and the literature review, as shown in Figure 1.

Figure 1 − Hypothesised Model

Source: Authors (2024)

2.9 Research Hypotheses

The hypotheses summarised below are based on the primary goal of this study, the findings of the literature review, and the hypothesised model.

Hypothesis 1: *Product - service design has a positive significant impact on competitive advantage.*

Hypothesis 2: *Product - service design has a positive significant relationship with strategic planning.*

Hypothesis 3: *Strategic planning has a positive significant impact on competitive advantage.*

Hypothesis 4: *Strategic planning has a mediating effect on the relationship between Product - service design and competitive advantage.*

3. Methodology

The subject of this research, TAZARA, is a railway authority jointly owned by Zambia and Tanzania and has been in operation since its inception in 1975. Out of a target population of 240, the questionnaire was distributed to 200 managers with a response rate of 75%, resulting in 150 completed questionnaires. Using Jamovi software, the model's fit, reliability and validity were tested using regression, factor and principal component analysis in order to draw meaningful conclusions about the relationships between strategic planning, product-service design and competitive advantage.

3.1 Sample and Participants

This study used a stratified random sampling technique to ensure a representative sample from different departments within the Tanzania Zambia Railway Authority (TAZARA). The sampling frame included all managers with at least three years of experience in their respective positions, allowing for the selection of a sample of 200 managers. This approach was chosen to capture different perspectives within the organisation and increase the generalisability of the findings.

3.2 Data Collection

Data were collected through a self-administered questionnaire using a five-point Likert scale ranging from 'strongly agree' (5) to 'strongly disagree' (1). To maximise accessibility and response rates, the questionnaire was distributed in two formats:
- Physical copies: Questionnaires were delivered directly to managers at their place of work.
- Online survey: An online version was made available, allowing managers to participate conveniently from any location with internet access.

The questionnaire was pre-tested with a sample of 20 managers prior to full distribution. The purpose of this pre-test was to identify and address any ambiguities or areas for improvement in the clarity and understandability of the questions. Based on the

feedback from this pre-testing phase, the questionnaire was refined and then distributed to the final sample of 200 managers. The response rate was 75%, with 150 completed questionnaires returned. The sample size of 150 from a target population of 240 was the minimum recommended by Krejcie and Morgan (1970) for conducting scientific research (see Table 1).

Table 1 – Determining the Sample Size of a Given Population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note: N is population size, S is sample size.
Source: Krejcie and Morgan (1970)

3.3   Data Analysis

Data analysis was carried out using Jamovi software (version 2.3.28 solid), a robust tool for statistical analysis. Descriptive statistics were used to summarise the demographic characteristics of the respondents. Various statistical tests were performed to assess the fit, reliability and validity of the model:

- Regression analysis: This technique was used to assess the relationships between the study variables.
- Factor analysis: Used to identify the underlying factors influencing the data and to group related variables.
- Principal Component Analysis (PCA): Used as a dimensionality reduction technique to identify the most significant factors explaining the variance in the data.

3.4 Measures

The constructs of strategic planning, product-service design and competitive advantage were measured using five-point Likert scales with responses ranging from 'strongly agree' (5) to 'strongly disagree' (1). The measures for these constructs were developed based on established scales from the literature, specifically from the works of Coşkun (2011), Ang et al. (2000), Prajogo and Sohal (2006), Claver et al. (2003), Terziovski (2006), Berhanu (2019), and Hilmy (2016). This ensured the reliability and validity of the measurement instruments used in the study.

4. Results and Discussion

The quantitative research approach was used in the analysis, which was carried out using Jamovi software. The results of the study are presented in the form of descriptive statistics, tables, figures and hypothesis tests.

4.1 Demographic Characteristics

Table 2 shows the demographic profile of the 150 respondents who participated in the study based on their gender and experience.

Table 2 – Demographic Profile

Description	Frequency	Percentage (%)
Gender		
Female	25	16.7
Male	125	83.3
Total	150	100
Experience in Years		
< 10	42	28
10-20	56	37.3
> 20	52	34.7
Total	150	100

Of the 150 respondents, 83.3% (125) were male and 16.7% (25) were female. Of the 150 respondents, 28% (42) had less than 10 years' experience, 37.3% (56) had 10 to 20 years' experience and 34.7% (52) had more than 20 years' experience with the organisation.

4.2 Descriptive Statistics

The mean, standard deviation, skewness and kurtosis for the constructs used in this research are shown in Table 3.

Table 3 – Mean, Standard Deviation, Skewness, & Kurtosis of Constructs (N = 150)

	SP	CA	PSD
N	150	150	150
Mean	3.24	2.91	3.18
Standard deviation	0.730	0.764	0.850
Skewness	-0.203	-0.0885	-0.308
Std. error skewness	0.198	0.198	0.198
Kurtosis	0.302	-0.0327	-0.0499
Std. error kurtosis	0.394	0.394	0.394

SP=Strategic Planning
CA-Competitive Advantage
PSD= Product-Service Design
Source: Jamovi computation

The mean values of the three constructs suggest that respondents responded positively. The skewness and kurtosis were in the -2 to +2 range, indicating that there was no significant deviation from normalcy for either component.

4.3 Reliability and Validity

4.3.1 Testing Assumptions of Study Variables

The data from the study were subjected to validity and reliability tests to ensure that the data could be analysed using factor analysis. Data must meet four assumptions in order to produce accurate results when using principal component analysis (Landau & Everitt, 2003). These assumptions include a linear relationship between variables, multiple variables scored at either ordinal or continuous levels, no major outliers, and sufficient sampling. After examination, the sample data collected met all four assumptions. In order to perform Principal Component Analysis (PCA), the data must contain at least 150 examples (Fan et al., 2008).

Therefore, the 150 cases met the minimum data requirement for PCA. A reliability test was conducted to provide reliable measures of the consistency and internal validity of the measures used. Cronbach alpha was calculated for all three construct scales using reliability analysis with a recommended minimum threshold of 0.7 (Hair et al., 2006; Nunnally, 1978).

4.3.2 Results of Reliability and Validity Tests

The 19 items in the instrument were factored. It was subsequently found that all 19 items correlated with at least one other item by at least three points (0.3), indicating good factorability. The Kaiser-Meyer-Olkin (KMO) indicator of sampling adequacy was 0.915 above the threshold of 0.6. The KMO measure of sampling adequacy shows the proportion of variance in variables that could be caused by underlying factors. Bartlett's sphericity test was statistically significant (χ^2 (171) = 1270, p < .001). Based on the results, PCA was considered appropriate for the 19 items presented in Table 4.

Table 4 – Kaiser-Meyer-Olkin and Barlett's Test result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.915
Bartlett's Test of Sphericity	Approx. Chi Square	1270
	Degrees of freedom	171
	Significance	.000

Source: Jamovi computation

The analysis shows that the Cronbach's alpha of the instrument was significantly higher than the required minimum of 0.7 (Nunnally, 1978; Hair et al., 2006). The alpha coefficient of the instrument ranged from 0.767 to 0.822. The strategic planning scales had an alpha coefficient of .822, the competitive advantage scales had an alpha coefficient of .802 and the product-service design scales had an alpha coefficient of .767. Table 5 shows that the Cronbach alpha coefficients for all three components met the required minimum level of 0.7.

Table 5 – Cronbach Alpha Test Results

Items	Cronbach's Alpha	McDonald's Mega	Number of Items	Comment
Overall	.920	.921	19	Accepted
Strategic Planning	.822	.827	11	Accepted
Product-Service Design	.767	.769	3	Accepted
Competitive Advantage	.802	.803	5	Accepted

Source: Jamovi computation

4.4 Linearity

The relationship between the independent and dependent variables is linear. The computation of Spearman and Pearson correlation coefficients, as shown in Table 6, validated this premise.

The results show that there are significant positive relationships between product service design, strategic planning and competitive advantage. There is a positive significant correlation coefficient of .504 between Product Service Design and Competitive Advantage. There is a significant positive correlation coefficient of .663 between product service design and strategic planning. There is a significant positive correlation coefficient of .597 between strategic planning and competitive advantage. The correlations suggest that there were no collinearity problems as they were all less than 0.85. The issue of multicollinearity does not arise (Hair et al., 2010).

4.5 Model Fit

Before estimating the suggested model, the regression model was tested individually.

4.5.1 Overall Regression Model Testing

The following hypothesis was used to examine the significance of the regression model.

H0: $\beta1 = \beta2 = ... Bi = 0$

Ha: At least one regression coefficients is $\neq 0$

Table 6 – Construct Correlation Matrix

		SP	PSD	CA
SP	Pearson's r	—		
	Spearman's rho	—		
	N	—		
PSD	Pearson's r	0.663 ***	—	
	Spearman's rho	0.579 ***	—	
	N	150	—	
CA	Pearson's r	0.597 ***	0.504 ***	—
	Spearman's rho	0.547 ***	0.452 ***	—
	N	150	150	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

SP=Strategic Planning
CA-Competitive Advantage
PSD= Product-Service Design
Source: Jamovi computation

The regression analysis revealed the existence of a strong and significant relationship between the constructs. The first model in Table 7 shows an excellent fit and significant values of R(0.597), R^2(0.356) and an F-value of 81.8, indicating the impact of strategic planning on competitive advantage. According to the model, strategic planning accounts for 36% of the variation in competitive advantage. The second model, which examined the impact of product-service design on competitive advantage, showed a good fit and significant values of R (0.504), R^2 (0.254) and F-value (50.5). Thus, product-service design accounts for 25% of the variation in competitive advantage. The final model demonstrating the relationship between strategic planning and product-service design had acceptable goodness of fit values of R(0.663), R^2(0.439) and a substantial F-value of 116. According to the model, strategic planning accounts for 44% of the variation in product-service design.

Table 7– Regression Model Fit Measure Summary

Model		R	R²	Adjusted R²	Overall Model Test	
					F	P
1	SP predicting CA	0.597	0.356	0.352	81.8	< .001
2	PSD predicting CA	0.504	0.254	0.249	50.5	< .001
3	SP predicting PSD	0.663	0.439	0.435	116	< .001

CA = Competitive Advantage
SP=Strategic Planning
PSD= Product-Service Design
Source: Jamovi computation

4.6 Hypothesis Testing

This study tested four hypotheses concerning a direct relationship and an indirect influence. Table 8 shows the results of the hypotheses tested. Table 8 displays the model path coefficients and their significance results. The study's four-relationship hypotheses are all supported.

Hypothesis 1 on the effect of product-service design on competitive advantage is statistically significant ($\gamma = 0.453$, p<0.001). As a result, hypothesis 1 is supported. When strategic planning is mediated, the link (direct effect) remains statistically significant at ($\gamma = 0.175$, p< .05). This suggests that strategic planning serves as a bridge between product-service design and competitive advantage. As a result, Hypothesis 4 is supported.

Product-service design has a substantial positive connection with strategic planning ($\gamma = 0.569$, p< .001). As a result, hypothesis 2 is supported. Strategic planning has a considerable beneficial influence on competitive advantage ($\gamma = 0.490$, p< .05). As a result, hypothesis 3 is supported.

Table 8 – Model Path and Mediation Estimates

		Mediation Estimates				
Effect	Label	Estimate	SE	Z	p	% Mediation
Indirect	a × b	0.279	0.0574	4.86	< .001	61.5
Direct	c	0.175	0.0774	2.26	0.024	38.5
Total	c + a × b	0.453	0.0634	7.15	< .001	100.0

		Path Estimates			
	Label	Estimate	SE	Z	p
PSD→ SP	a	0.569	0.0525	10.84	< .001
SP → CA	b	0.490	0.0900	5.44	< .001
PSD→ CA	c	0.175	0.0774	2.26	0.024

Source: Jamovi computation

4.6.1 Analysis of mediating effect

Through strategic planning, the indirect influence of product-service design on competitive advantage is statistically significant (p< 0.001, $\gamma = 0.279$; ratio effect = 0.615). As a result of this indicating a partial mediation impact of strategic planning, hypothesis 4 is supported.

4.7 Linearity

The results provided excellent support for the theoretical paradigm of product-service design, strategic planning and competitive advantage. According to the results of this survey, the majority of TAZARA management is male. The data also suggested that the majority of managers had between 10 and 20 years' experience, with those with more than

20 years' experience coming in second. This shows that TAZARA's management is a skilled team.

The primary objective of the study was to determine whether product-service design has a significant positive impact on competitive advantage. Hypothesis 1 on the effect of product-service design on competitive advantage is statistically significant ($\gamma = 0.453$, $p<0.001$). Therefore, hypothesis 1 is supported. When strategic planning is mediated, the relationship (direct effect) remains statistically significant at ($\gamma = 0.175$, $p< .05$). This suggests that strategic planning acts as a bridge between product-service design and competitive advantage. Therefore, hypothesis 4 is supported. This study confirms and also supports the previous studies that have shown that product-service design has a positive significant impact on competitive advantage (Brissaud et al., 2022; Tryson, 2022; Teixeira et al., 2012; Mukhtar et al., 2012; Polaine et al., 2013; Martinez et al., 2010; Baird et al., 2011; Rau et al., 2017; Geng et al., 2010; Ferdousi et al., 2018).

The results of the study also showed that product service design has a significant positive relationship with strategic planning. Product service design has a significant positive relationship with strategic planning ($\gamma = 0.569$, $p< .001$). Therefore, hypothesis 2 is supported. This is consistent with previous research that found a positive significant relationship between product-service design and strategic planning (Mitake et al., 2020; Kurpiela, 2022; An et al., 2008).

The results of the study also showed that strategic planning has a significant positive impact on competitive advantage. Strategic planning has a significant positive impact on competitive advantage ($\gamma = 0.490$, $p< .05$). Therefore, hypothesis 3 is supported. This is consistent with previous studies that found similar results (Tryson, 2022; Mulyaningsih et al., 2021; Kiiyo, 2019), but not with other studies that found contradictory results (Miller et al., 2004; Powell, 1992).

The final objective of this study was to examine whether strategic planning mediates the relationship between product-service design and competitive advantage. Through strategic planning, the indirect influence of product-service design on competitive advantage is statistically significant ($p< 0.001$, $\gamma = 0.279$; ratio effect $= 0.615$). As this indicates a partial mediating effect of strategic planning, hypothesis 4 is supported. The results indicate that strategic planning partially mediates the relationship between product-service design and competitive advantage. This is the first study to empirically assess the mediating effect of strategic planning on the relationship between product-service design and competitive advantage. Further research is required to confirm these findings.

4.8   Theoretical Managerial Implications

The empirical findings of this study provide valuable insights for both decision makers and practicing managers. The partial mediating effect of strategic planning on the relationship between product-service design and competitive advantage implies that organisations need to invest in both the formulation and implementation of strategic planning processes. Focusing solely on product-service design while ignoring strategic planning, or vice versa, would prevent an organisation from achieving or maintaining competitiveness.

5. Conclusion

This study provides robust evidence for the critical role of product-service design and strategic planning in enhancing competitive advantage. The results clearly indicate that both product-service design and strategic planning have a significant positive relationship with competitive advantage, confirming hypotheses 1, 2 and 3. The results show that product-service design directly influences competitive advantage, which is consistent with previous research that emphasises the importance of innovative and customer-centric product-service solutions (Brissaud et al., 2022; Yangailo, 2023b). Furthermore, strategic planning was found to be an important mediator of this relationship, reinforcing the idea that a well-developed strategic planning process can enhance the effectiveness of product-service design in gaining competitive advantage (Barry, 1997; Henderson & Hines, 2019). The mediation effect, with an indirect impact ratio of 61.5%, highlights the role of strategic planning in facilitating the transition from product-service design to competitive advantage, thus validating Hypothesis 4.

The results of the study also show a strong positive relationship between product-service design and strategic planning ($\gamma = 0.569$, p< .001), confirming Hypothesis 2. This finding underscores the need for organisations to integrate strategic planning with product-service design efforts, aligning design initiatives with long-term strategic goals to ensure sustainable competitive advantage. The significant correlation between strategic planning and competitive advantage ($\gamma = 0.490$, p< .05) further reinforces the notion that strategic planning is essential for leveraging product-service design to achieve and sustain competitive advantage (Mulyaningsih et al., 2021; Kiiyo, 2019).

The implications of these findings are significant for both practitioners and academics. For practitioners, the findings advocate a strategic approach to product-service design in which strategic planning is not just a supporting function, but a critical element that enhances the effectiveness of design. This finding encourages managers to develop robust strategic plans that are closely aligned with their product-service design strategies to ensure that their offerings are not only innovative, but also strategically positioned to outperform competitors. For academics, the study opens avenues for further research, particularly in exploring other potential mediators or moderators that may influence the relationship between product-service design and competitive advantage. Future research could also extend the study to different industries and geographical contexts in order to further generalise the findings.

In conclusion, this study highlights the critical interplay between product-service design, strategic planning and competitive advantage. It highlights the importance of integrating strategic planning into product-service design processes to enhance competitive advantage, providing valuable insights for both theory and practice in the field of strategic management.

5.1 *Future Research and Limitation of Study*

One of the main limitations of this study is the relatively small sample size, which is limited to specific industries. This limitation limits the generalisability of the findings, making it difficult to apply the results broadly across industries and geographical regions. Future research could improve the external validity of the findings by including larger and more diverse samples.

Another important limitation is the cross-sectional design of the study. By collecting data at a single point in time, this design limits the ability to infer causality between product-service design, strategic planning and competitive advantage. Longitudinal studies that follow subjects over time could provide more robust insights into the temporal dynamics and causal relationships between these variables.

Relying on self-reported data from respondents introduces the possibility of bias that may affect the results of the study. Self-reported measures are subject to various biases, such as social desirability bias, where respondents may provide answers that they believe are more socially acceptable rather than a true reflection of their experiences. To mitigate this problem, future studies could incorporate multiple data sources, including objective performance measures, to validate and supplement self-reported data.

Finally, the scope of strategic planning examined in this study is somewhat limited. The research considers strategic planning as a mediating variable, but does not explore the specific elements or dimensions of strategic planning that might influence the relationship between product-service design and competitive advantage. Future research could explore different aspects of strategic planning in more detail to understand their different effects and how they interact with other variables in the context of competitive advantage.

References

1. An, Y., Lee, S., & Park, Y. (2008). Development of an integrated product-service roadmap with QFD: A case study on mobile communications. *International Journal of Service Industry Management*, *19*(5), 621-638.
2. Ang, C. L., Davies, M., & Finlay, P. N. (2000). Measures to assess the impact of information technology on quality management. *International Journal of Quality & Reliability Management*, *17* (1), 42-66. https://doi.org/10.1108/02656710010300135
3. Baird, K., Jia Hu, K., & Reeve, R. (2011). The relationships between organizational culture, total quality management practices and operational performance. *International journal of operations & production management*, *31*(7), 789-814.
4. Barry, B. W. (1997). Strategic planning workbook for nonprofit organizations. Amherst H. Wilder Foundation.
5. Berhanu, N. (2019). *Total Quality Management (TQM), Competitive Advantage and Ownership in Ethiopian Construction Sector*, thesis, Addis Ababa University [online] http://etd.aau.edu.et/ handle/123456789/16056.
6. Brissaud, D., Sakao, T., Riel, A., & Erkoyuncu, J. A. (2022). Designing value-driven solutions: The evolution of industrial product-service systems. *CIRP annals*, *71*(2), 553-575.
7. Brondoni, S. M., Corniani, M., & Riboldazzi, S. (2013). Global retailers, market-driven management and innovation. *International Journal of Economic Behavior (IJEB)*, *3*(1), 27-40. DOI: https://doi.org/10.14276/2285-0430.1870
8. Chatterjee, S., Chaudhuri, R., Vrontis, D., & Thrassou, A. (2023). Revisiting the resource-based view (RBV) theory: from cross-functional capabilities perspective in post COVID-19 period. *Journal of Strategic Marketing*, 1-16. https://doi.org/10.1080/0965254X.2023.2182447

9. Claver, E., Tari, J. J., & Molina, J. F. (2003). Critical factors and results of quality management: an empirical study. *Total quality management & business excellence*, *14*(1), 91-118. https://doi.org/10.1080/14783360309709

10. Coskun, S. (2011). Strategic management and total quality management: similarities, differences and implications for public administration. *Amme Idaresi Dergisi*, *44*(2), 43-69. 20.1001.1.22285067.1397.24.69.3.9

11. Fan, K., O'Sullivan, C., Brabazon, A., and O'Neill, M. (2008). Non-linear principal component analysis of the implied volatility smile using a quantum-inspired evolutionary algorithm. In *Natural computing in computational finance* (pp. 89-107). Springer, Berlin, Heidelberg

12. Ferdousi, F., Baird, K., Munir, R., & Su, S. (2018). Associations between organisational factors, TQM and competitive advantage: Evidence from an emerging economy. *Benchmarking: An International Journal*, *25*(3), 854-873.

13. Furrer, O. (1997). Le rôle stratégique des services autour des produits. *Revue française de gestion*, (113), 98-108.

14. Geng, X., Chu, X., Xue, D., & Zhang, Z. (2010). An integrated approach for rating engineering characteristics' final importance in product-service system development. *Computers & Industrial Engineering*, *59*(4), 585-594.

15. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Canonical correlation: A supplement to multivariate data analysis. *Multivariate Data Analysis: A Global Perspective, 7th ed.; Pearson Prentice Hall Publishing: Upper Saddle River, NJ, USA*.

16. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Structural equation modeling: An introduction. *Multivariate data analysis. 6th Edition. New Jersey: Pearson Prentice Hall*, 752-753.

17. Henderson, A. E., & Hines, R. D. (2019). Using concepts from strategic planning. *Data Strategy in Colleges and Universities: From Understanding to Implementation*, 37-52. Routledge.

18. Hilmy, A. M. (2016). *Effect of total quality management practices on competitive advantage of transport and logistics firms in Mombasa County, Kenya* (Thesis, University of Nairobi). http://hdl.handle.net/11295/99414

19. Kiiyo M. (2019). The role of employee behaviour and organizational structure in the relationship between strategic planning and competitive advantage of large manufacturing firms in Kenya (Dissertation). University of Nairobi.

20. Kotler, P. (2000). *Marketing Management*, New Jersey: Prentice Hall.

21. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, *30*(3), 607-610.

22. Kurpiela, S., & Teuteberg, F. (2022). Strategic planning of product-service systems: A systematic literature review. *Journal of Cleaner Production*, *338*, 130528.

23. Landau, S., & Everitt, B. S. (2003). *A handbook of statistical analyses using SPSS*. Chapman and Hall/CRC. https://doi.org/10.1201/9780203009765

24. Madhani, P. M. (2010). Resource based view (RBV) of competitive advantage: an overview. *Resource based view: concepts and practices, Pankaj Madhani, ed*, 3-22. University Press, Hyderabad, India, 2009 , Available at SSRN: https://ssrn.com/abstract=1578704

25. Martinez, V., Bastl, M., Kingston, J., & Evans, S. (2010). Challenges in transforming manufacturing organisations into product-service providers. *Journal of manufacturing technology management*, *21*(4), 449-469.

26. Miller S., Wilson D., & Hickson D. (2004). Beyond planning: Strategies for successfully implementing strategic decisions. *Long Range Planning*, 37(3), 201–218.
27. Mitake, Y., Hiramitsu, K., Tsutsui, Y., Sholihah, M. A., & Shimomura, Y. (2020). A Strategic Planning Method to Guide Product—Service System Development and Implementation. Sustainability, 12(18), 7619.
28. Mukhtar, M., Ismail, M. N., & Yahya, Y. (2012). A hierarchical classification of co-creation models and techniques to aid in product or service design. *Computers in Industry*, 63(4), 289-297.
29. Mulyaningsih, M., Danial, R., Komariah, K., Firdausijah, R. T., & Yuniarti, Y. (2023). The effect of strategic planning on competitive advantages of small and medium enterprises. *Management Science Letters*, *11*, 411-416.
30. Nunnally, J.D. (1978). *Psychometric Theory* (2nd ed), New York: McGraw-Hill.
31. Oyeniyi, O., & Abiodun, A. J. (2012). Measuring retail service quality in Nigerian departmental stores. *International Journal of Economic Behavior (IJEB)*, *2*(1), 37-45. DOI: https://doi.org/10.14276/2285-0430.1946
32. Peruzzini, M., Marilungo, E., & Germani, M. (2014). A QFD-based methodology to support product-service design in manufacturing industry. In *2014 International Conference on Engineering, Technology and Innovation (ICE)* (pp. 1-7). IEEE.
33. Polaine, A., Løvlie, L., & Reason, B. (2013). *Service design: From insight to implementation*. Rosenfeld media.
34. Powell T. C. (1992). Research notes and communications strategic planning as competitive advantage. *Strategic Management Journal*, 13(7), 551–558.
35. Prajogo, D. I., & Sohal, A. S. (2006). The relationship between organization strategy, total quality management (TQM), and organization performance—the mediating role of TQM. *European journal of operational research*, *168*(1), 35-50. https://doi.org/10.1016/j.ejor.2004.03.033
36. Rau, C., Zbiek, A., & Jonas, J. M. (2017). Creating Competitive Advantage from Services: A Design Thinking Case Study from the Commodities Industry Service design thinking can provide the tools to help companies design value propositions that meet customer needs and sustain competitive advantage. *Research-Technology Management*, *60*(3), 48-56.
37. Sharp, B. (1991). Marketing orientation: more than just customer focus. *International Marketing Review,8*(4). https://doi.org/10.1108/EUM0000000001540
38. Teixeira, J., Patrício, L., Nunes, N. J., Nóbrega, L., Fisk, R. P., & Constantine, L. (2012). Customer experience modeling: from customer experience to service design. *Journal of Service management*, *23*(3), 362-376.
39. Terziovski, M. (2006). Quality management practices and their relationship with customer satisfaction and productivity improvement. *Management Research News,29*(7), 414-424. https://doi.org/10.1108/01409170610690871
40. Tracey M,, Vonderembse M.A. and Lim J.S. (1999). Manufacturing technology and strategy formulation: Keys to enhancing competitiveness and improving performance. *Journal of Operation Management,* 17,411–428. https://doi.org/10.1016/S0272-6963(98)00045-X
41. Tryson, Y. (2022). The Mediating Effect of Customer Focus on the Relationship Between Strategic Planning and Competitive Advantage in Railway Sector. *Journal of Operations and Strategic Planning*, *5*(1), 59-81. https://doi.org/10.1177/2516600X221097756

42. Vasquez-Parraga, A. Z., & Sahagun, M. A. (2014). Explaining Customer Loyalty to Retail Stores In US Hispanic Markets. *International Journal of Economic Behavior (IJEB)*, *4*(1), 3-16. DOI: https://doi.org/10.14276/2285-0430.1881

43. Yangailo, T. (2022). The Mediating and Moderating Effect of Total Quality Management Practices on the Association between Strategic Planning and Competitive Advantage: The Case of Railway Sector. *International Journal of Productivity and Quality Management.* DOI:10.1504/IJPQM.2022.10045473

44. Yangailo, T. (2023a). The mediating and moderating effect of total quality management practices on the association between strategic planning and competitive advantage: the case of railway sector. *International Journal of Productivity and Quality Management,40*(4), 491-511.https://doi.org/10.1504/IJPQM.2023.135882

45. Yangailo, T. (2023b). Assessing the influence of transformational leadership on competitive advantage through important innovations and quality results: Case of railway industry. *Management Science Letters*, *13*(1), 41-50. doi: 10.5267/j.msl.2022.9.003

46. Yangailo, T. (2024a). The Impact of Education and Training on Product–Service Design: The Moderation of Competitive Advantage. *IJEBD (International Journal of Entrepreneurship and Business Development)*, *7*(1), 1-11. https://doi.org/10.29138/ijebd.v7i1.2630

47. Yangailo, T. (2024b). Strategic Planning on Productivity through Leadership Commitment and Employee Involvement. *DBS Applied Research and Theory Journal*, *1*, 46-69.

48. Yangailo, T. (2024c). The Role of Strategic Planning and Productivity in Predicting Competitive Advantage. *Trends in Business and Economics*, *38*(2), 83-91. DOI: 10.16951/trendbusecon.1468564.

Appendices

Principal Component Analysis

Component Loadings	Component			Uniqueness
	1	2	3	
PSD1			0.683	0.454
PSD2			0.769	0.325
PSD3			0.754	0.365
CA1		0.747		0.383
CA2		0.692		0.415
CA3		0.646		0.468
CA4		0.629		0.554
CA5		0.763		0.407
SP1	0.564		0.378	0.530
SP2	0.462		0.587	0.394
SP3	0.472		0.480	0.487
SP4	0.710			0.490
SP5	0.758			0.362
SP6	0.729			0.349
SP7	0.537		0.311	0.543
SP8	0.595		0.394	0.437
SP9	0.448	0.371	0.514	0.397
SP10	0.367	0.332		0.667
SP11	0.499	0.489		0.453

Note. 'varimax' rotation was used

Assumption Checks

Bartlett's Test of Sphericity

χ^2	df	p
1270	171	< .001

KMO Measure of Sampling Adequacy

	MSA
Overall	0.915
PSD1	0.914
PSD2	0.900
PSD3	0.918
CA1	0.896
CA2	0.921
CA3	0.892
CA4	0.875
CA5	0.876
SP1	0.901
SP2	0.938
SP3	0.949
SP4	0.892
SP5	0.873
SP6	0.919
SP7	0.916
SP8	0.947
SP9	0.956
SP10	0.881
SP11	0.943

Estimate Plot
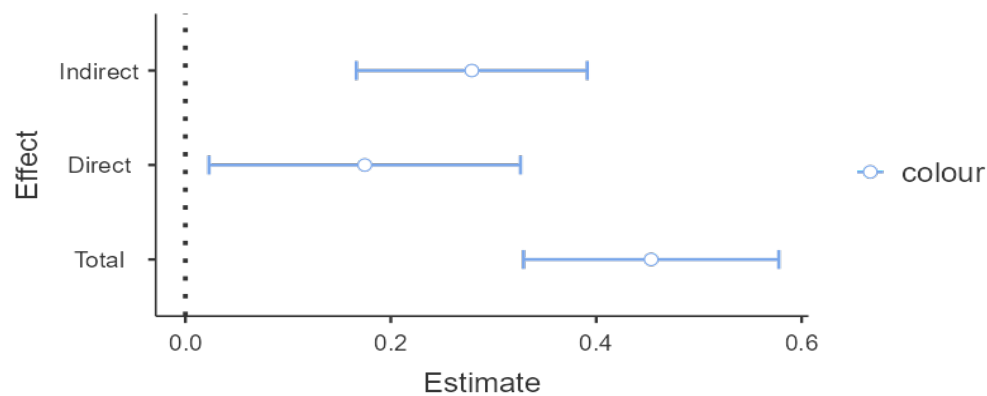
Plot
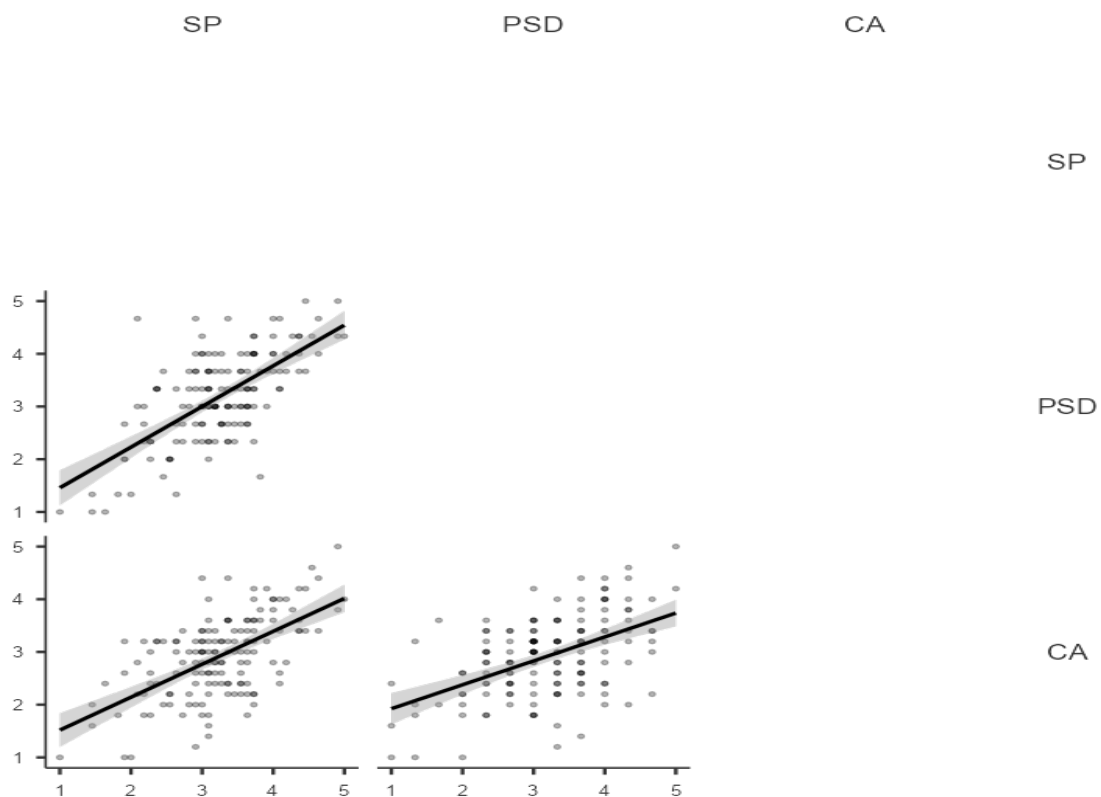
Reliability Analysis

	Mean	SD	Cronbach's α	McDonald's ω
Scale	3.14	0.664	0.920	0.921

Scale Reliability Statistics

Correlation Heatmap
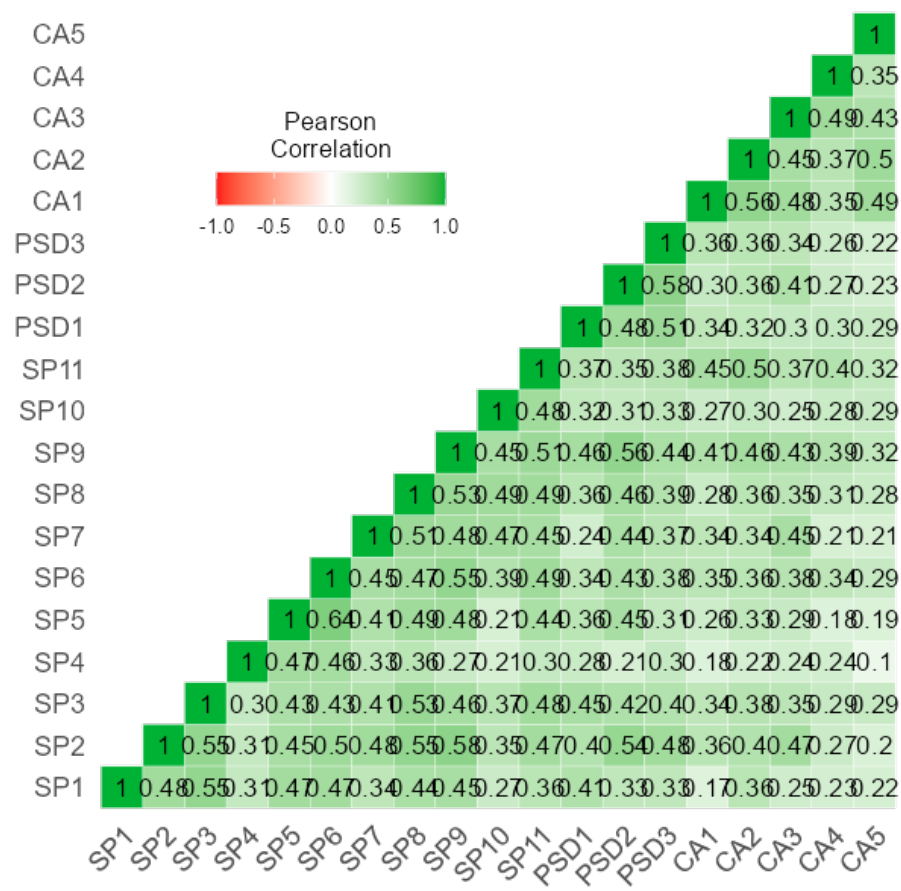
Reliability Analysis

	Mean	SD	Cronbach's α	McDonald's ω
scale	2.91	0.764	0.802	0.803

Scale Reliability Statistics

Correlation Heatmap
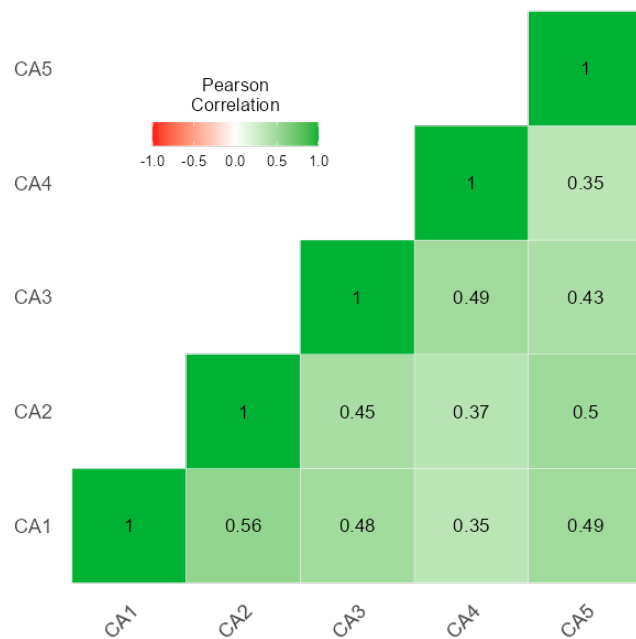
Reliability Analysis

	Mean	SD	Cronbach's α	McDonald's ω
scale	3.18	0.850	0.767	0.769

Scale Reliability Statistics

Correlation Heatmap
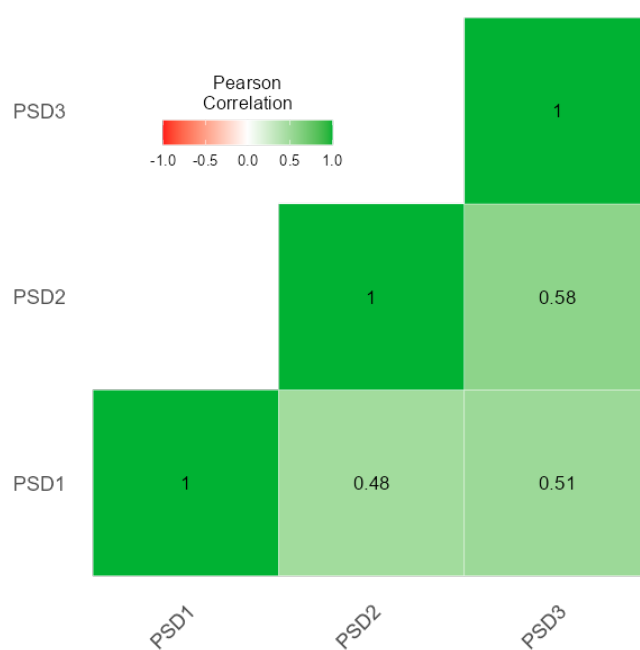
IMPLEMENTING SUSTAINABLE TOURISM CERTIFICATION: A STUDY OF ECST IN ITALIAN PROTECTED AREAS

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Abstract

The main objective of this preliminary research is to study how managers of Italian natural parks perceive the European Charter for Sustainable Tourism (ECST) certification. A qualitative method based on semi-structured interviews was adopted, as nine managers from different Italian natural parks were interviewed for the study. The results show that the common perception of the certification is that the ECST helps demonstrate the authenticity of sustainable practices employed by the parks, promotes sustainable management and fosters collaboration between different stakeholders. However, the study also highlights the perceived challenges related to the communication and education strategies employed by the parks to maximize the certification's impact. The paper concludes that while the ECST is perceived as critical to promoting sustainability in natural parks, its effectiveness depends on a multifaceted approach that needs to address both the practical implementation and involve local stakeholders. The study provides relevant information to policymakers and certification bodies officials to refine the ECST obtainment process and its promotion. Future research should employ a more structured approach to validate these preliminary findings in order to sustain competitive advantage. Future research should replicate this study in other industries and explore additional moderating and mediating variables to provide more comprehensive insights.

1. Introduction

Natural parks serve numerous functions for environmental preservation, such as preserving critical ecosystems and the habitats of endangered flora and fauna species (Hummel et al., 2019; Hussain, Iqbal & Shah, 2024), and provide essential ecosystem services such as clean water, air purification, and climate regulation (Vieira et al., 2018). They also offer spaces for recreation, education, and scientific research (Buckley, 2020; Pu et al., 2023; Buckley et al., 2023).

These fragile environments are increasingly threatened by human presence, mainly from tourism. According to Buckley (2011), over-tourism can be a potent cause of habitat degradation and environmental pollution, damaging the very ecological nature of the parks that attract visitors. New threats of natural parks land acquisition and exploitation by tourism entities are also being reported (Sauls & Devine, 2023; Buckley, 2024), with consequent danger and damage to the natural environment.

This has been the case for more than two decades, as mentioned by studies from Eagles et al. (2002), which highlighted how the influx of tourists can disturb wildlife, cause soil erosion, and increase waste and water usage, leading to significant environmental stress. It is thus crucial to balance conservation efforts and tourism practices to preserve the integrity of natural parks.

Environmental certifications have emerged as a critical tool in addressing these challenges by providing a standardised framework for sustainable management. Certifications such as the European Charter for Sustainable Tourism (ECST), the EU Eco-Management and Audit Scheme (EMAS), and ISO 14001 help organisations systematically manage their environmental impacts, ensuring that tourism operations are conducted ecologically responsibly. These certifications offer a method for validating and communicating the sustainability efforts of entities that welcome tourists, thus building trust with consumers and other stakeholders.

The European Charter for Sustainable Tourism (ECTS) is a certification awarded by the Europarc Federation, the organisation that represents the European protected areas. Protected areas (PAs) include national parks, regional parks, nature parks, natural reserves and biosphere reserves (EUROPARC Federation). The ECTS represents a participatory governance method whose goal is to promote sustainable tourism in European protected areas, considering all aspects of environmental, social and economic impact. The ECST promotes partnership with all stakeholders, including local tourism operators, to elaborate a tourism offer compatible with the needs of biodiversity protection in protected areas (Ritchie, 2015).

In Italy, a country renowned for its rich natural heritage and numerous protected areas (Sabatini, 2023), the adoption of environmental certifications by natural parks has become increasingly common. Italian natural parks are crucial to the country's environmental conservation efforts and integral to its tourism industry (Voghera et al., 2021). As such, the managers of these parks face the complex task of implementing sustainable practices while meeting the expectations of a diverse range of stakeholders, including tourists, local communities and lawmakers.

While the role of certifications in sustainable tourism has been widely discussed in the literature over the years (Abeliotis, 2006; Bricker & Schultz, 2011; Moncada, 2024), and the perception of these certifications has also been studied worldwide (Zametter, Burlando & Bosco, 2022), there is a specific gap in how Italian natural parks upper management perceives the ECST certification.

The objective of this paper is thus to provide a preliminary study on how these managers perceive the ECST certification, as their perception influence the decision-making processes surrounding the adoption and implementation of certifications and ultimately determine the success of these initiatives in achieving long-term environmental goals. Specifically, the research aims to understand the perceived benefits and challenges associated with obtaining this certification.

By determining these perceptions, the study provides valuable insights for future research into the factors that could help the adoption of environmental certifications. To achieve this goals, nine semi-structured interviews with Italian natural parks managers were conducted.

The paper is structured in six sections: introduction, literature review, methodology, results, conclusions, and references. In the next section, the literature review is presented.

2. Literature Review

The academic literature considered for this study concerned two main concepts: (i) protected areas managers' motivations and perceptions regarding environmental certifications, (ii) the current state of the literature concerning the ECST.

The main considered work for the first concept was the systematic review conducted by García-Álvarez and de Junguitu (2023) of 73 studies that concerned environmental certifications (mainly EMAS and ISO 14001) published from 1998 to 2021 to provide the researchers with the basic notions regarding the motivations that made tourism entities managers decide to pursue the certifications mentioned above.

The study divided the motivations into two main categories: internal motivations (presented in Table 1) and external motivations (presented in Table 2).

Table 1 – Internal motivations

Internal Motivation	Authors
Environmental friendliness and performance	Miteva (2017), Murmura, Bravi & Santos (2021)
Better financial results by reducing costs	Emilsson & Hjelm (2002); Bracke, Verbeke & Dejonckheere (2008)
Regulatory compliance	Grolleau, Mzoughi & Thomas (2007); Murmura et al. (2018); Pedersen (2007)
Introduction of new environmental technologies	Miteva (2017)
Efficiency	Morrow & Rondinelli (2002)
Internal stakeholders pressure	Diez Martín et al. (2008); Neugebauer (2012)
Better corporate management and human resource management	Emilsson & Hjelm (2002); Grolleau, Mzoughi & Thomas (2007)

Source: García-Álvarez and de Junguitu (2023).

Table 2 – External motivations

External Motivation	Authors
External stakeholder pressure	Martín, García & de Castro (2008); Lannelongue & González-Benito (2012)
Customer demands	Grolleau, Mzoughi & Thomas (2007); Díaz de Junguitu & Allur (2019)
Improved image and reputation	Murmura et al. (2018); Ociepa-Kubicka, Deska & Ociepa (2021)
Market opportunities	Steger, Schindel & Krapf (2002); Miteva (2017)
Favourable institutional contexts	Emilsson & Hjelm (2002); Bracke, Verbeke & Dejonckheere (2008)
National culture	Steger, Schindel & Krapf (2002)

Source: García-Álvarez and de Junguitu (2023).

Overall, the review showed that in most of the analysed works, the interviewees showed a positive reception of the certifications (García-Álvarez & de Junguitu, 2023).

For the second concept mentioned, the studies directly involving the ECST were considered, to understand the current state of the literature on the matter. Most of the works were specific case studies concerning the implementation of the ECST in one particular natural area.

The study from Balandina et al. (2012) concerned the Lativan Natural Park of Kemeri. They analysed the ECST implementation, showing how one of the main innovations was the creation of the Kemeri Charter Forum, which put in contact with various local stakeholder groups, specifically areas management, municipalities, tourist businesses, residents, NGOs and tourist organisations (Balandina et al., 2012). As stated by the authors:

> *The key to success in Kemeri National Park has been to establish direct and personal contacts between park staff and tourism stakeholders, creating a basis for long-term relationships and cooperation. Strong personal relationships have led to a new approach to nature protection; it is now easier to focus on positive actions - what can be done - rather than restrictions - what cannot be done* (Balandina et al., 2012, pp. 137-138).

Castellani and Sala (2010), in their work concerning the adoption of the ECST in the Italian protected areas of the Alpi Lepontine, also stated that the adoption of the ECST helped promote sustainable development not only in the natural park but in the whole region, involving many local stakeholders.

Capanna Piscé (2021) studied the role and effectiveness of the ESCT participatory processes in the Torre del Cerrano (Italy) marine protected area. The study confirmed the importance of the certification participatory processes in involving the local stakeholders.

Murmura and Capanna Piscé (2022) also examined the governance model introduced through the ECST. They specifically analysed the case of the Sirente Velino natural park (Italy), highlighting the ECST impact on tourism management in the protected area. Through in-depth interviews with key stakeholders and a survey of tourism actors, their study demonstrated that the collaborative framework of ECST fostered stronger cooperation between public institutions and private actors.

Torres-Delgado and Palomeque (2012) analysed another case study of the implementation of the ECST, specifically in the Spanish park or La Gomera, mainly focusing on a new methodology to evaluate the certification. Navaglio (2008) focused specifically on how to improve the efficiency in the certification implementation.

Considering the current literature on the matter and the years of publication, a clear gap emerged on how current park managers perceive the ECST, its impact, and the criticalities tied to the certification obtainment process.

3. Methodology

In order to support the adoption of the ECST certification and to provide preliminary research to serve as a foundation for more detailed studies, one research question has been considered:

RQ1. *How do Italian natural parks managers perceive the European Character for Sustainable Tourism (ECST) certification?*

To address this question, the study draws on qualitative data collected through in-depth interviews with nine key figures in the Italian natural park sector.

3.1 Nature of the research

The methodology adopted was a qualitative approach that involved data collected through in-depth interviews with nine management figures in the Italian natural park sector.

It employed semi-structured interviews, a method chosen to facilitate an in-depth exploration of participants' perceptions while maintaining the flexibility to focus in specific areas of interest as they arose during the discussions. Many studies have deemed this technique particularly effective in capturing detailed insights and allowing for interactive exchanges (Niccolini, Cavallini, Giannini & Contini, 2018; Mose & Mehnen, 2020).

3.2 Population and sampling

The researcher, in charge of monitoring and implementing the European Charter for Sustainable Tourism (ECST) between June 2022 and July 2023, conducted face-to-face interviews with selected Italian nature park managers with the help of Federparchi (Europarc Italia), which facilitated the identification of contacts. This approach enabled direct contact with key stakeholders, ensuring the data collected was relevant and comprehensive.

The participants in this study were selected based on their roles as managers of natural parks in Italy. Nine participants in total were interviewed, each holding a management position in their respective parks.

Their direct involvement in decision-making processes related to the implementation of the ECST ensured that the interviewees had substantial experience and insights into the role and impact of these certifications within their organizations. It should be noted that the parks and employing them also varied in size, geographic location and level of tourism activity, providing a diverse representation of the Italian natural park sector.

3.3   Field guidelines

The interviews were conducted in person, each lasting between 45 and 60 minutes. Given the role of the interviewer at the time, to make the participant feel at ease, the decision was made not to record the interviews and only use written notes.

Specifically, the interviewer focused on writing down three main aspects: the main key points that emerged during the interviews, the implications for the sector, and lastly, his considerations. The interview was guided by ten main questions (Table 3):

Table 3 – Questions used during the interviews

N.	Interview Question
1	What is your opinion on the importance of the ECST certification (but also others such as EMAS and ISO 14001) for sustainable tourism in natural parks and protected areas?
2	How does the ECST certification influence sustainable management practices in natural parks and protected areas?
3	How does the ECST certification impact collaboration between organisations and stakeholders in the sustainable tourism sector?
4	How does the ECST certification contribute to communicating sustainable practices to tourists and other industry stakeholders?
5	What are the main benefits of adopting the ECST certification for natural parks?
6	Are there challenges or obstacles in implementing and maintaining the ECST certification? If so, what are they?
7	How does the ECST certification influence tourists' perception and behaviour in natural parks and protected areas?
8	How do you see the role of the ECST certification in promoting environmental, socio-economic, and cultural sustainability in natural parks?
9	What are the prospects for using environmental certifications in sustainable tourism, particularly for natural parks?
10	How does the ECST certification facilitate cooperation between the public and private sectors in the sustainable management of natural parks?

Source: Authors' elaboration.

4. Results

The data emerged from the interviews described in the methodology section, which involved nine managers of Italian natural parks, is showed in Table 4. From the analysis of this data, four key themes emerged regarding the perceptions of the ECST certification:

1. The legitimization and credibility given by certifications (Int. 1 and Int. 5).
2. The certification role in driving sustainable management practices and more organized management structures (Int. 3, Int. 4 and Int. 9).
3. The importance of certifications in fostering collaboration and networking among stakeholders (Int. 6, Int. 8 and int 9).
4. The educational and communication challenges associated with certifications (Int. 2, Int.4, Int 5 and Int. 7).

Table 4 − Interviews Results, including the key points that emerged during the interviews, the implications for the sector and the research considerations taken during the interviews

Int.	Key Points emerged	Implication for the sector	Researcher considerations
1	Certifications like the ECST, EMAS, and ISO 14001 are essential to demonstrate the authenticity of sustainable practices, as they prove the actual implementation of sustainable practices. Many countries and organisations label themselves as "sustainable" or "eco-friendly" without concrete evidence, so there is a need to distinguish between genuinely sustainable tourism businesses and those that are sustainable in name only, and certifications serve as an independent and credible verification system to prove that natural parks follow sustainability rules and regulations. Certifications increase the transparency of business practices and help build trust between consumers and tourism organisations.	There may be increasing pressure on tourism organisations to obtain recognised certifications. The sector might move toward greater standardisation of sustainable practices. here may be a need to educate consumers and organisations about the importance and significance of various certifications.	The interviewee appears strongly convinced that certifications are the only reliable way to demonstrate commitment to sustainability. There is evident concern about greenwashing in the tourism sector. The interviewee views certifications as a tool to create a level playing field in the sustainable tourism sector.
2	There is a strong need for both individual and corporation awareness towards natural parks, as awareness is the first step toward sustainable practices. Emphasis on translating awareness into concrete actions and implementing sustainable practices after gaining awareness. I recommend working with recognised entities to obtain certifications. Recognition of an educational gap in the field of sustainable tourism. Emphasis on the "long road" still ahead. The critical role of Start-ups and Youth: Start-ups are more inclined to seek environmental certifications, and young people are considered the "prescribers" of sustainability.	There may be a need for targeted educational programs on sustainability in tourism. Start-ups could become leaders in the adoption of certified sustainable practices. The sector might see increased demand for expert consultancy to obtain certifications. There could be a greater focus on involving young people in sustainable tourism initiatives.	The interviewee emphasizes a gradual approach: awareness, action, and certification. There is a strong focus on the role of new generations and new businesses in driving change. It is acknowledged that the sector is still developing in terms of sustainability. Education is seen as a key element in promoting sustainable practices.

3	Certifications help natural parks achieve sustainability goals, as they are seen as a catalyst for implementing sustainable practices. After obtaining certification, we need to create detailed management systems, emphasising the importance of structured management to maintain sustainability standards. Many Italian parks would only adopt sustainability measures with the incentive of certifications. Such certifications serve as an external stimulus for implementing eco-friendly practices.	There may be an increased focus on developing sustainable management systems in natural parks. Certifications could become a de facto standard in the natural parks sector. There might be a rise in demand for consultancy services to implement sustainable management systems. The sector could evolve toward more structured and formalised management practices.	The interviewee views certifications as a necessary tool to drive change. There is a perception that many organisations would not be intrinsically motivated to adopt sustainable practices. The importance of formal management structures to ensure long-term sustainability is highlighted.
4	Certifications help align natural parks with sustainability goals, providing a framework for sustainable practices. Most natural parks either have certifications or seek to obtain them – this indicates a growing trend toward adopting sustainability standards. Potential imitation effect: other countries might follow Italy's example. Certifications as a tool for international leadership in sustainability. Certifications are crucial for spreading best practices. There is a need to improve communication within the sector to maximise impact.	There may be a greater focus on communication strategies for sustainable practices. The sector might see increased efforts in international collaboration based on common standards. A positive competition among countries could develop to demonstrate leadership in sustainable tourism. New opportunities may emerge for consultants and experts in sustainability communication.	The interviewee views certifications as a tool for standardising and spreading sustainable practices. There is a strong emphasis on the potential of certifications to influence practices beyond national borders. A communication gap is recognised, which could limit the impact of certifications.
5	Certifications serve as tangible proof of sustainable practices. Foreign tourists might be inspired by the sustainable practices they observe. Certifications can act as tools of soft power and cultural influence. There is a need to actively communicate sustainable practices to influence others,	The sector might see a rise in investment in international communication campaigns about sustainable practices. New metrics could be developed to measure the influence and impact	The interviewee sees certifications as a management tool and a means of influence and inspiration. There is a strong emphasis on the role of communication in maximising the impact

	as a lack of communication can make sustainability efforts invisible. The visibility of sustainable practices can encourage others to follow suit	of sustainable practices on international visitors. Collaboration between tourism entities and communication experts might increase to maximise the impact of certifications.	of sustainable practices. The Interviewee believes in the potential of certifications to create a ripple effect in the global tourism industry.
6	Certifications like ECST in Italian parks promote the sharing of values and ideals among different organisations and create a common foundation of sustainability principles. Certifications encourage a shared focus on environmental conservation issues, creating conservation goals across different organisations. Certifications stimulate coordinated efforts to minimise waste and promote a systematic approach to resource management. Certifications foster a network of organisations with similar goals, facilitating the exchange of best practices and knowledge.	There may be a greater focus on creating networks and platforms for sharing sustainability knowledge, as the sector might see increased collaborative initiatives between parks and certified organisations. New partnership models based on shared sustainability values and goals could develop. The demand for training and professional development focused on the sustainability principles promoted by certifications may increase.	The interviewee sees certifications as a tool to create cohesion and alignment in the sector. There is an emphasis on the role of certifications in promoting a shared culture of sustainability. The potential of certifications to stimulate collaborations and synergies among different organisations is recognised.
7	Tourists are increasingly concerned about the environmental impact of parks. Certifications serve as a response to these rising expectations. The ECST certification facilitates communication among different parts of the tourism sector, creating a common language around sustainability. Certifications promote adopting common standards in the tourism sector, facilitating benchmarking and comparison among organisations.	There may be an increased focus on developing marketing strategies highlighting certifications and sustainable practices. The sector might see a rise in investment in staff training on sustainability communication. New tools and platforms could be developed to facilitate cross-sector communication and collaboration on sustainability.	The interviewee recognises a shift in consumer demand toward more sustainable practices. There is an emphasis on the role of certifications in improving communication and collaboration within the sector. The importance of a unified approach to sustainability in tourism is also highlighted.

8	Certifications in Italian natural parks promote cooperation among municipal stakeholders, creating a common ground for local-level collaboration. This cooperation wouldn't occur spontaneously without certifications – they serve as a stimulus for local stakeholder engagement. Certifications also help align sustainability goals among municipal actors, facilitating a shared vision for sustainable territorial development. They also provide a framework to overcome potential conflicts or divergences among local stakeholders, as they promote a collaborative approach to natural resource management.	There may be a greater focus on developing participatory governance models in natural parks. New mechanisms for coordination and collaboration between public and private entities at the local level could develop. There may be a growing demand for facilitators and mediators specialised in managing multi-stakeholder processes in the context of sustainable tourism.	The interviewee views certifications as a crucial tool for stimulating local-level cooperation. There is recognition of the potential for certifications to overcome existing inertia and barriers. The interview strongly emphasised the importance of a participatory approach to the sustainable management of natural parks.
9	Environmental certifications oversee the sustainable approach of the destination, providing a framework for the overall management of sustainability. Certifications also promote balanced involvement between the public and private sectors. Creating a platform for cross-sector collaboration. Focus on managing environmental, socio-economic, and cultural sustainability in natural parks. Promotion of an integrated approach to sustainability. Certifications support the development of the capacity to effectively implement sustainable practices by providing guidelines and standards for the concrete implementation of sustainability policies.	There may be an increased focus on developing collaborative governance models for managing natural parks. New professional roles specifically for sustainability management in natural parks could develop. There may be a growing demand for tools and methodologies to measure and monitor the impact of sustainable practices across all aspects (environmental, socio-economic, and cultural).	The interviewee views certifications as a tool for the overall governance of sustainability. There is a strong emphasis on the importance of a balanced and inclusive approach involving all sectors. The interviewee recognises the role of certifications in creating concrete operational structures for sustainable management

Source: Authors' elaboration.

4.1   Legitimize and improve the park credibility

The perception that the ECST certification helps parks prove that they genuinely implement sustainable practices and methods in their management structure is among the most common themes emerged from the interviews.

Most prominently among Interviewees 1 and 5, the interviewees consistently emphasised that certifications provide a credible, third-party validation of their sustainability efforts. This helps distinguish genuinely sustainable parks from those claiming to be eco-friendly.

Interviewee 1 noted that in a context where many organizations may label themselves as sustainable without concrete evidence, the ECST offers reliable proof that increases transparency and builds trust with tourists, local citizens and stakeholders.

Interviewee 5 highlighted that the certification doesn't only confirm the implementation of sustainable practices but also acts as a tool of soft power, influencing both local and international perceptions through its certified authenticity.

This dual function, both as a mark of credibility and as a countermeasure against greenwashing, suggests that widespread adoption of ECST could drive a trend toward standardized sustainable practices across the sector.

This is supported by current literature, highlighting the importance of certifications in enhancing transparency and accountability in the tourism sector (Font & Harris, 2004; Murmura et al., 2018; Zametter, Burlando & Bosco, 2022), thus helping the overall credibility of natural parks as sustainable tourism destinations.

4.2 Drive sustainable management practices and organised management structures

The study highlights that the ECST certification is also perceived as an effective method for driving sustainable practices and structured management systems within natural parks. Interviewees 3, 4 and 9 emphasized how obtaining certifications often necessitates the development of comprehensive management systems that put sustainability at the core of park operations. According to Interviewee 3 and 4, the process of certification goes beyond simply meeting regulatory requirements, as it prompts park management to adopt a more systematic approach that formulates clear goals, structures, and benchmarks for maintaining high sustainability standards.

This structured management framework allows parks to set clear sustainability targets, prioritize resource management, and ensure continuous improvement. Interviewee 9 pointed out that certifications create incentives for parks to install appropriate tracking mechanisms for sustainability metrics such as waste reduction, energy savings, and biodiversity conservation. Through this process, parks establish formal governance structures and protocols to manage their sustainability efforts more effectively.

Furthermore, certifications like ECST create a structured pathway for parks to align their operations with international sustainability standards, thus fostering greater consistency and standardization across the sector.

This structured approach is recognized as essential, particularly in the context of growing pressures to demonstrate real environmental commitment.

These findings align with previous literature, (Grolleau, Mzoughi & Thomas 2007; Bracke, Verbeke & Dejonckheere 2008; Buckley, 2012; Murmura et al., 2018), which emphasized that environmental certifications play a key role in translating sustainability principles into actionable practices, providing clear guidelines and measurable standards for effective implementation.

4.3 Foster collaboration and networking among stakeholders

The perception of certifications having a role in fostering collaboration and networking among different stakeholders was also highlighted during the interviews, particularly among Interviewee 6, 8 and 9.

Interviewee 6 explained that certifications like ECST promote the sharing of core values and ideals, creating a common foundation that encourages the exchange of best practices and coordinated efforts in environmental conservation.

Interviewee 8 emphasized that the certification process serves as a stimulus for local stakeholder engagement, aligning the sustainability goals of municipal authorities, private entities, and natural parks, which in turn facilitate participatory governance and collaborative decision-making at the local level.

Interviewee 9 further noted that by providing a unified framework, certifications not only ensure balanced involvement between the public and private sectors but also create a platform for cross-sector collaboration to manage environmental, socio-economic, and cultural sustainability. These insights align with existing research (Eagles, 2002; Castellani & Sala, 2010; Balandina et al., 2012), which underscores that effective collaboration is crucial for achieving sustainable tourism goals.

4.4   *Educational and communication challenges associated with certifications*

The most significant problematics emerged concerned the concerned the challenge of education and awareness regarding certifications and sustainability. Interviewees 2 and 7 pointed out that park staff and the general public often needed a clearer understanding of the certification process and of what the certification itself represented.

This aligns with previous literature, identifying a need for more awareness and education as barriers to adopting sustainable practices among tourism-related entities (Font & Harris, 2004; Šimková, Kořínková & Obršálová, 2023).

The study also identified potential collaboration barriers, particularly concerning communication. Interviewees 2, 4, 5, and 7 pointed out that the lack of communication can limit the impact of certifications, as stakeholders may need to be fully aware of each other's efforts or how they can contribute to shared goals.

They argued that without visible and consistent communication efforts, the sustainability efforts of parks might go unnoticed, limiting their influence and impact. This finding is supported by current literature, which highlights the role of communication in raising awareness and encouraging responsible behaviour among tourists (Moscardo, 2008; Tölkes, 2020; León & Araña, 2020).

By effectively communicating their sustainability practices and achievements, parks can attract environmentally conscious visitors and set a benchmark for other parks and tourism entities to aspire to. The study suggests that communication should be considered an integral part of the certification process rather than an afterthought.

5.   Conclusions

This study serves as preliminary research into the perception of the ECST certification among current managers of Italian natural parks. It is essential to emphasise the preliminary nature of the research conducted, focused on partially filling the gap in the current literature by bringing fresh and up-to-date data, laying the foundations for future more comprehensive and resource-intensive studies, as the insights obtained in many different fields highlight the need for further research to fully understand the complexity of environmental certification in the context of the management of natural parks.

The findings of this preliminary study suggest that certifications among natural parks managers are considered crucial instruments for promoting and validating sustainable practices, driving structured management and fostering collaboration across the sector. However, the study also reveals criticalities related to intrinsic motivations, education processes, and communication strategies, which warrant further in-depth exploration.

The critical insights that emerged from this initial research are (i) the perceived role of certifications in establishing the credibility of sustainability claims, (ii) the role of certifications in implementing and maintaining sustainable management practices, (iii) the potential role of certifications in fostering collaboration among the parks and various public and private entities and stakeholders, (iv) the need for targeted educational programs that not only inform park staff and the public about the importance of certifications but also inspire a more profound commitment to sustainable practices, (v) the need of effective communication strategies to ensure that the sustainability efforts of parks reach the wider public and are visible to both tourists, local lawmakers and public and private stakeholders.

The theoretical contributions of the study involve expanding the existing body of literature on environmental certifications used in the tourism sector by offering new insights into the perceptions of Italian natural parks upper management regarding the ECST certification. While previous research has examined the role of environmental certifications such as EMAS and ISO 14001 in tourism management, there has been limited focus specifically on the ECST. This study partially fills that gap by exploring how natural park managers perceive the certification, thereby advancing theoretical discussions on sustainable tourism governance.

Concerning the managerial implications of the study, the research provides relevant insights to policymakers and certification bodies officials. The park's managers perceived strengths and weaknesses associated with the ECST and the processes needed to obtain it can be used to refine the certification process and the way the certifications are promoted.

The limitations of the study lie in the number of participants and the methodology employed, as the researcher was alone during the interviews and chose not to record them to keep the interviewees at ease, so future research in this field could benefit from a second researcher in the room, to better gauge the answers of the interviewees, and from a complete recording, to be able to analyse the insights emerged comprehensively. While the role of the researcher at the time and the measures taken to make the participants agree to the interviews are one of the study's main limitations, it also allowed the study to happen in the first place.Future studies could include a larger sample size and a more structured approach to validate these preliminary findings and explore their implications. They could also include the intrinsic motivation of park managers to adopt sustainable practices beyond the requirements of certifications.

References

1. Abeliotis, K. (2006). A review of EMAS in Greece: Is it effective? *Journal of Cleaner Production, 14*(18), 1644–1647.
2. Balandina, A., Lovén, L., Ostermann, O., & Partington, R. (2012). European Charter Parks − A growing network for sustainable tourism development in protected areas. *Parks, 18*(2), 132.
3. Bracke, R., Verbeke, T., & Dejonckheere, V. (2008). What determines the decision to

implement EMAS? A European firm level study. *Environmental and Resource Economics, 41*, 499–518.

4. Bricker, K. S., & Schultz, J. (2011). Sustainable tourism in the USA: A comparative look at the Global Sustainable Tourism Criteria. *Tourism Recreation Research, 36*(3), 215–229.

5. Buckley, R. (2011). Tourism and environment. *Annual Review of Environment and Resources, 36*(1), 397–416.

6. Buckley, R. (2012). Sustainable tourism: Research and reality. *Annals of Tourism Research, 39*(2), 528–546.

7. Buckley, R. (2020). Nature tourism and mental health: Parks, happiness, and causation. *Journal of Sustainable Tourism, 28*(9), 1409–1424.

8. Buckley, R., Chauvenet, A., Zhong, L., & Campbell, C. (2023). Mental health value of parks in China. *Biological Conservation, 284*, 110159.

9. Buckley, R. C., Underdahl, S., Keto, A., & Chauvenet, A. L. (2024). Conservation threats from tourism land grabs and greenwash. *Biological Conservation*, *299*, 110792.

10. Castellani, V., & Sala, S. (2010). Sustainable performance index for tourism policy development. *Tourism Management, 31*(6), 871–880.

11. Díaz de Junguitu, A., & Allur, E. (2019). The adoption of environmental management systems based on ISO 14001, EMAS, and alternative models for SMEs: A qualitative empirical study. *Sustainability, 11*(24), 7015.

12. Eagles, P. F. (2002). Trends in park tourism: Economics, finance and management. *Journal of Sustainable Tourism, 10*(2), 132–153.

13. Emilsson, S., & Hjelm, O. (2002). Implementation of standardised environmental management systems in Swedish local authorities: Reasons, expectations and some outcomes. *Environmental Science & Policy, 5*(6), 443–448.

14. EUROPARC Federation. (2022). European Charter for Sustainable Tourism in Protected Areas. EUROPARC Federation. Retrieved from https://www.europarc.org/sustainable-tourism/european-charter/ on 01/06/2024

15. Font, X., & Harris, C. (2004). Rethinking standards from green to sustainable. *Annals of Tourism Research, 31*(4), 986–1007.

16. García-Álvarez, M., & de Junguitu, A. D. (2023). Shedding light on the motivations and performance of the eco-management and audit scheme (EMAS). *Environmental Impact Assessment Review, 99*, 107045.

17. Grolleau, G., Mzoughi, N., & Thomas, A. (2007). What drives agrifood firms to register for an Environmental Management System? *European Review of Agricultural Economics, 34*(2), 233–255.

18. Hussain, S., Iqbal, K., & Shah, A. (2024). The Role of Protected Areas in Conserving Tropical Forests: A Review. *Journal of Selvicoltura Asean*, *1*(5), 229-238.

19. Hummel, C., Poursanidis, D., Orenstein, D., Elliott, M., Adamescu, M. C., Cazacu, C., & Hummel, H. (2019). Protected area management: Fusion and confusion with the ecosystem services approach. *Science of the Total Environment, 651*, 2432–2443.

20. Lannelongue, G., & González-Benito, J. (2012). Opportunism and environmental management systems: Certification as a smokescreen for stakeholders. *Ecological Economics, 82*, 11–22.

21. León, C. J., & Araña, J. E. (2020). Tourist sustainable behaviour and personal communication. *Annals of Tourism Research, 85*, 102897.

22. Martín, F. D., García, M. L. M., & de Castro, E. P. D. (2008). Los grupos de interés y la presión medioambiental. *Cuadernos de Gestión, 8*(2), 81–95.

23. Miteva, A. (2017). Opportunities for expanding the application of Environmental Management and Audit Scheme in Bulgaria. *Bulgarian Journal of Agricultural Science, 23*(6).

24. Moncada, P. (2024). GSTC CRITERIA AS SELF-DIAGNOSIS TOOL IN THE MEXICAN CARIBBEAN.

25. Moscardo, G. (2008). Sustainable tourism innovation: Challenging basic assumptions. *Tourism and Hospitality Research, 8*(1), 4–13.

26. Morrow, D., & Rondinelli, D. (2002). Adopting corporate environmental management systems: Motivations and results of ISO 14001 and EMAS certification. *European Management Journal, 20*(2), 159–171.

27. Murmura, F., Bravi, L., & Santos, G. (2021). An assessment of the EMAS standard in developing an effective environmental strategy: An analysis of certified companies in Italy. *The TQM Journal, 34*(6), 1600–1625.

28. Murmura, F., & Capanna Piscè, G. (2022). Tourism Participative Management in Protected Areas: Case Study in the Protected Area of Parco Naturale Regionale Sirente Velino. In *National Congress of Commodity Science* (pp. 519-525). Cham: Springer International Publishing.

29. Murmura, F., Liberatore, L., Bravi, L., & Casolani, N. (2018). Evaluation of Italian companies' perception about ISO 14001 and eco management and audit scheme III: Motivations, benefits and barriers. *Journal of Cleaner Production, 174*, 691–700.

30. Niccolini, F., Cavallini, I., Giannini, M., & Contini, M. (2018). The European protected areas approach to organizing ecotourism: A study of benchmark protected areas. In *Tourism, Health, Wellbeing and Protected Areas* (pp. 11–25). CAB International.

31. Ociepa-Kubicka, A., Deska, I., & Ociepa, E. (2021). Organizations towards the evaluation of environmental management tools ISO 14001 and EMAS. *Energies, 14*(16), 4870.

32. Pedersen, E. R. (2007). Perceptions of performance: How European organisations experience EMAS registration. *Corporate Social Responsibility and Environmental Management, 14*(2), 61–73.

33. Piscè, G. C. (2021). The "Torre del Cerrano" Marine Protected Area and the European Charter for Sustainable Tourism in Protected Areas as an Ecotourism Management Tool. *International Journal of Economic Behavior (IJEB), 11*(1), 79-97.

34. Pu, X., Ding, W., Ye, W., Nan, X., & Lu, R. (2023). Ecosystem service research in protected areas: A systematic review of the literature on current practices and future prospects. *Ecological Indicators, 154*, 110817.

35. Ritchie, C. (2015). The place of protected areas in the European landscape: A EUROPARC Federation perspective. In *Nature Policies and Landscape Policies: Towards an Alliance* (pp. 43–50).

36. Sabatini, F. (2023). Geografia dei parchi nazionali italiani di Giacomo Zanolin. *Semestrale di Studi e Ricerche di Geografia, (1)*.

37. Sauls, L. A., & Devine, J. A. (2023). Geospatial technologies in tourism land and resource grabs: Evidence from Guatemala's protected areas. In *Routledge Handbook of Global Land and Resource Grabbing* (pp. 205–219). Routledge.

38. Steger, U., Schindel, C., & Krapf, H. (2002). The experience of EMAS in three European countries: A cultural and competitive analysis. *Business Strategy and the Environment, 11*(1), 32–42.

39. Tölkes, C. (2020). The role of sustainability communication in the attitude–behaviour gap of sustainable tourism. *Tourism and Hospitality Research, 20*(1), 117–128.

40. Torres-Delgado, A., & Palomeque, F. L. (2012). The growth and spread of the concept of sustainable tourism: The contribution of institutional initiatives to tourism policy. *Tourism Management Perspectives, 4*, 1–10.

41. Vieira, J., Matos, P., Mexia, T., Silva, P., Lopes, N., Freitas, C., ... & Pinho, P. (2018). Green spaces are not all the same for the provision of air purification and climate regulation services: The case of urban parks. *Environmental Research, 160*, 306–313.

42. Voghera, A., Negrini, G., Sammuri, G., & Agostinelli, A. (2021). Il ruolo delle Aree Protette per la ripartenza del Paese. In *Benessere e Salute delle Città Contemporanee* (pp. 184–192). Inu Edizioni.

43. Zametter, T., Burlando, C., & Bosco, F. (2022). Significance and effects of sustainable tourism certifications: A preliminary qualitative review of the first GSTC-D certified destinations in Italy and Austria.

44. Šimková, E., Kořínková, B., & Obršálová, K. (2023). Environmental education of tourists for sustainable tourism development. *Czech Journal of Tourism, 12*(1–2), 1–19.

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